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The IRON AGE

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Mama, the Price Fixer

THE gyrations of meat prices in the past few weeks have been accompanied by a rash of cartoons and learned discourses on "Mama"—the great, slowly-awakening power in the American economy and the final arbiter of prices.

Mama must not be confused with "Mom"—particularly Philip Wylie's Mom, that noisy neuter, all tongue and razzmatazz, with selfish simpering mouth and assorted psychoses, ever-willing to half starve her first-born for a new beaver-dyed mouton. No, Mama is of entirely different mettle. She's cast along strictly stylized lines—middle-aged, buxom, girded by a practical, neatly starched apron, with kindly face set in strange, grim lines of honest outrage and intensity of determination. Sometimes she's pictured holding aloft a rolling pin presumably to beat down prices—sometimes clutching the family pocketbook—and sometimes she glares belligerently at an equally stylized merchant. Whatever the picture, the theme is that Mama is going to settle everything—she's going to bring the American economy into balance, she's going to neatly do the job that patriotism, OPA bureaucracy and sharpened wartime morality could not do.

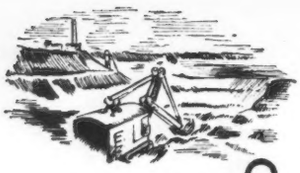
It is certainly an engaging solution to many of today's price aberrations. It has the advantage of being a simple answer to interplay of very complex variables, so simple as to lead only to wonder as to why all the Mamas of foreign countries haven't policed their respective economies into better order.

Mama is going to have some busier days for a few months now. A whole flood of consumer items already have adjusted themselves to the realities of cost figures, and good solid advances in the selling prices of many basic raw materials have taken place. More are in the offing. In a month or so they will have worked their way through the production pipeline and will be staring Mama in the eye.

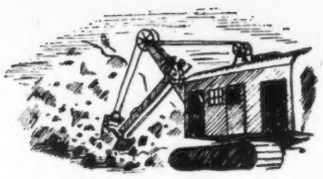
Maybe Mama will fold under the strain and drop the problem onto Papa's slightly stooped shoulders. Papa doesn't make very good newspaper copy and he always looks a little self-conscious in cartoons. He has a kind of harried look around his eyes and seems somewhat bewildered at times. But it is just possible that Papa is the real arbiter of prices, and that Mama has been a "front" all along.

Papa may or may not understand the classical concept of supply and demand, or maybe he doesn't even care much. But, he may, willy-nilly, become the final arbiter of prices—for Papa's money may just run out!

T. W. Lippert



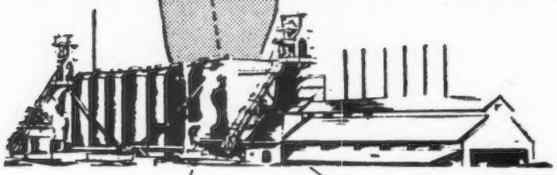
Iron Ore from Hibbing and Ironton, Minnesota



Limestone from Port Inland, Michigan

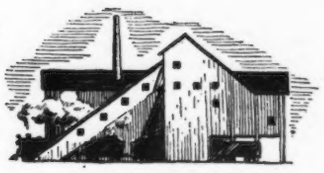
Iron Ore from Iron River and Ishpeming, Michigan

INLAND . . . all the way!



Plants at Indiana Harbor and Chicago Heights

Fluorspar from Rosiclare, Illinois



Coal from Wheelwright, Kentucky

The making of steel comprises many elements and processes, among which the gathering of raw materials is of prime importance. The Inland map shows the many points from which we gather these raw materials in the Central States area.

The principal ingredient, iron ore, comes by Inland ore boats from the Mesabi and Cuyuna ranges in Minnesota and the Marquette and Menominee ranges in Michigan.

Port Inland furnishes limestone to serve as flux in the blast furnaces and open hearths. Because a ton of coke is required to make a ton of finished steel products, thousands of tons of coal arrive daily from Wheelwright, Kentucky.

Most significant, however, is the fact that Inland Steel owns the mines and quarries from which these raw materials are taken . . . a fact which makes it possible to control quality from the raw materials to the finished steel—ready for use. This complete control from mine to consumer means—that the steel you buy bearing the famous diamond trademark, is . . . INLAND ALL THE WAY!

As with all fabricating materials, the demand for Inland steel now exceeds the supply. However, we are building new mills and expanding facilities that, we sincerely hope, will improve our steel deliveries in the future and eventually enable us to offer you all of the Inland steel you may require.

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► Admiral Byrd's 4000-man expedition to the South Pole may well intend to train personnel and test equipment in a sub zero climate. And there is always the possibility of finding uranium and setting up elaborate equipment to mine it and ship it north, but a better possibility is that this may be the logical answer to the search for a new weapons testing ground. It meets the need for secrecy, long range and safety, though some problems in low temperatures will have to be licked.

► Enough heat is dissipated by the 5000-hp Lycoming X-7 engine at takeoff to service a large office building or hotel. It amounts to 95,600 Btu's per min, and is accomplished by circulating the coolant at the rate of 750 gpm.

► It is reported that the Germans are producing the Volkswagen, Hitler's "people's car" and the Reichswehr's jeep for less than $500.

► A new high temperature alloy, GT-45 is moving out of the research into the production stage. It is a ferritic base alloy reported to have ease of fabrication among its virtues.

► Packaged production plants for manufacturing powdered metal parts, of potential interest to large powder metal parts users, are now in the development stage.

► Betatron radiation is now being made available for industrial inspection. While it will not be in the low price class, it will be competitive with existing 1 or 2 million-v X-ray equipment.

Primary advantage of betatron radiation is its speed of operation. Also cost for power is low (30 kva during exposure). Although its use is not considered practical for work less than 3 or 4 in. thick, its application has been successful up to 20 in. in thickness.

► A new six-spindle centrifugal casting machine has been developed for the production of welding rods at a rate of about 1500 lb per hr.

Rods thus cast require no sand blasting or cleaning other than the removal of fins which occasionally occur. Rejection losses, due to defectively cast rods, are said to be negligible.

► An effective antidote to hydrogen embrittlement in various types of steel springs has been found in the heating of these springs for 2½ hr at 527 F.

Heat treatment at this temperature does not damage the appearance of the plate and is applicable with good results to the hardness range of 40 to 57 Rc.

► A new abrasive of the fused alumina type owes its fortunate properties to its high purity which is believed to retard dulling of the cutting points. Nubbliness of these grains also makes for better bonding and for many cutting granules which allow individual grains to penetrate the work more deeply.

Known as 32 Alundum, this Norton abrasive promises to require fewer redressings, and permit heavier down feeds and cooler cutting.

► The uranium deposits in Chihuahua, Mexico, seizure of which was announced last week by the Mexican Government, are not on Republic Steel Corp. property. It will be recalled that rumors of discovery of uranium on Republic's property were not confirmed by small scale sampling.

► Redesign of lathes, especially the standard toolroom variety, can be expected all along the line. At present some producers of these machines are not showing a satisfactory profit.

► A method of reproducing drawings on metal without the necessity of darkroom techniques has been announced by Kodak. This Transfax process can be applied to all nonporous surfaces.

The drawings so transferred will withstand shearing, bending and punching with no tendency to loosen. It can also withstand the application of a cutting torch until it is carried away by the melting of the supporting metal.

► Aluminum nails, though still in the development stage, promise to play a larger part in future housing since their introduction in Canada, where they are reported to be cheaper than steel nails.

► An enameling sheet which will not require normalizing is now under development.

► Aluminum may be one of the items Sweden will export to Russia as a result of trade negotiations between the two countries now going on in Moscow.

► The U. S. Rubber Co. has an experimental aircraft tire which uses steel wire cord to carry almost twice the weight carried by present type tires of similar size. They will permit higher payloads and retract into the new thinner airfoils.

► Meat supply in the United States is nothing compared to the problem in Britain. Recently the Food Ministry proposed extra meat rations for the miners but the Trades Union Congress came back with the remark that it cannot exclude other claims. Foundry workers are asking for more meat, workers in steel mills and heavy industry in general are expected to be next, bringing total applicants for more meat to more than 300,000.

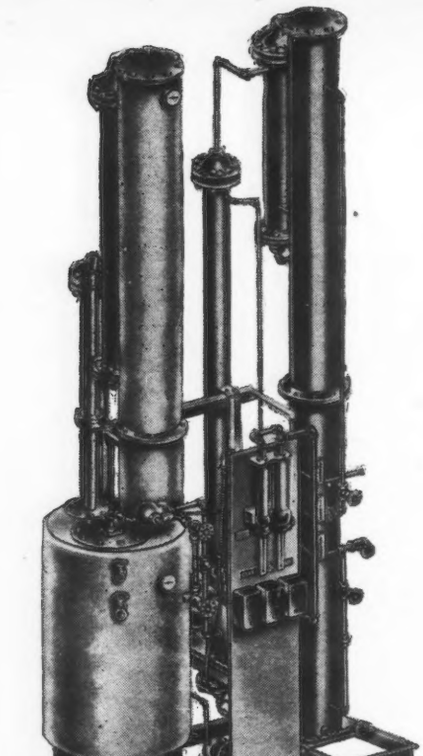


FIG. 1—A Neutralene gas producer incorporating the combined features of the atmosphere gas converter and CO_2-removal equipment.

A New Heat Treating Atmosphere Producer

By A. G. HOTCHKINS
Industrial Heating and Welding Engineering Div.,
and
H. M. WEBBER
Industrial Heating Div.,
General Electric Co.,
Schenectady

An atmosphere, such as Neutralene, free of carbon dioxide and moisture is, though highly desirable, uneconomical for many applications due to high cost of production. A new technique, whereby heat energy formerly wasted, is effectively applied in furnishing heat to the gas producing system, has resulted in considerable reductions in cost and space considerations. The authors describe the newly-devised flow charts and discuss various aspects of Neutralene as an effective heat treating atmosphere.

DURING recent years, metallurgists and heat treaters have recognized that not only does CO_2-free, dry combusted gas have excellent properties for the heat treatment of medium and high carbon steel without surface decarburization, but that the equipment in which it is produced has numerous advantages, as well. However, there have been a few disadvantages in the latter, such as higher cost, the reduction or elimination of which has been sought so as to permit wider use of the gas. The Neutralene gas producer, one of the recent developments in this field, has succeeded in overcoming practically all of these disadvantages.

The CO_2-free, dry combusted gas is practically neutral to medium and high carbon steels with respect to surface decarburization. The type of equipment which produces it has proved to be highly dependable and capable of operating over long periods of time without being shut down for maintenance. It affords a considerable degree of flexibility in that gases can be tapped off from various stages of manufacture or purification in the system. The outfit lends itself well to adaptation as a central atmosphere gas producing plant. Although these advantages have favored use of the gas and its producing equipment, the relatively high initial cost and operating cost, and the large amount of floor space occupied, have been considered disadvantages.

The new Neutralene gas-producing equipment retains all of the advantages of the conventional CO_2-free, dry combusted gas-producing equipment. Further, its initial cost is 10 to 20 pct lower, depending upon the size of machines considered. The operating cost of a 1000 cu ft per hr unit is reduced about $1000 per year (based on power at 1¢ per kw-hr) and the floor space occupied is reduced 55 pct.

Fig. 2 shows a flow diagram of a conventional CO_2-free, dry gas-producing equipment consisting of an atmosphere gas converter, a CO_2 remover (Girbotol system), and moisture-removal equipment such as a refrigerated gas cooler and a regenerative-type dryer. Boiling the CO_2-absorbing liquid (a solution of monoethanolamine and water) in the reactivating tower of the CO_2 remover has been one of the chief items of expense in this stage of the process, requiring approximately 18 kw-hr per 1000 cu ft of gas processed. This heat has usually been supplied by electric power applied to immersion type heating units in the smaller producers and by steam heat in the larger producers. It was realized that by combining the atmosphere gas converter and CO_2-removal equipment into a single unit, this power cost could be completely eliminated,

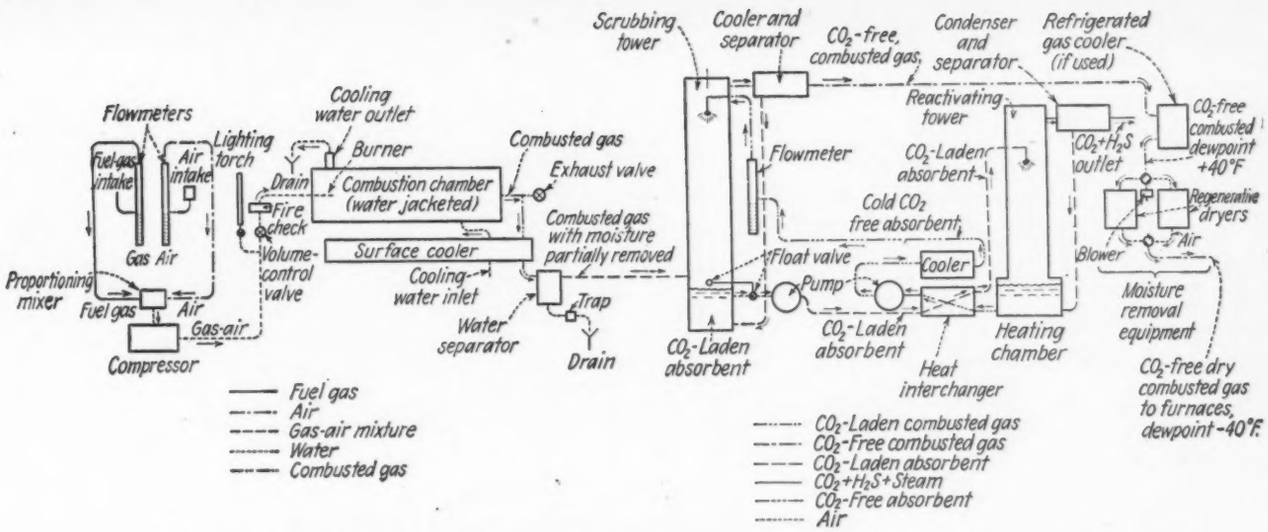


FIG. 2—A schematic diagram of the conventional equipment for producing CO_2—free, dry combusted gas.

and other advantages would be gained. The scheme involved building the combustion chamber of the former atmosphere gas converter into the boiler of the reactivating tower so that the heat formerly wasted in the water jacket of the combustion chamber could be utilized to boil the liquid in the reactivating tower. Tests showed that the idea was thoroughly practicable.

Fig. 1 shows a Neutralene gas producer incorporating the combined features of the atmosphere gas converter and CO_2-removal equipment, and fig. 3 is a flow diagram of this same basic Neutralene producing unit, plus the moisture removal equipment (at the right). In this flow diagram, fig. 3, the positions of the absorbing tower and reactivating tower have been reversed over those shown in fig. 2. This is for convenience in showing the combustion chamber built into the reactivating tower. Here it will be seen that the products of combustion leave the combustion chamber and pass through a gas cooler, then pass through the CO_2-absorbing tower and on into the moisture removal equipment. The CO_2-absorbing liquid passes through the same regenerating cycle as in the conventional equipment.

For a critical survey of the use of controlled atmospheres used in heat treating, see THE IRON AGE, *Sept.* 19, 1946, *p.* 42.

This combination of two stages into one in no way affects the basic operation of either stage and, at the same time, offers many advantages.

The initial investment for the combustion and CO_2-removal stages for instance, has been reduced 12 to 27 pct, depending upon the size. Inasmuch as the moisture removal equipment is the same in either case, there has been no reduction in that stage, so the overall reduction for the entire equipment is 10 to 20 pct. The savings are due to building the combustion chamber into the boiler, thus eliminating one unit, and the mounting of all of the component devices of the first two stages on a single base.

The conventional units have normally been shipped as separate pieces requiring assembly, piping, and wiring on the job. The new combination unit is not only completely assembled on a single base plate, but is piped and wired at the factory, practically ready for

FIG. 3—Flow diagram illustrating the Neutralene gas producer shown in fig. 1.

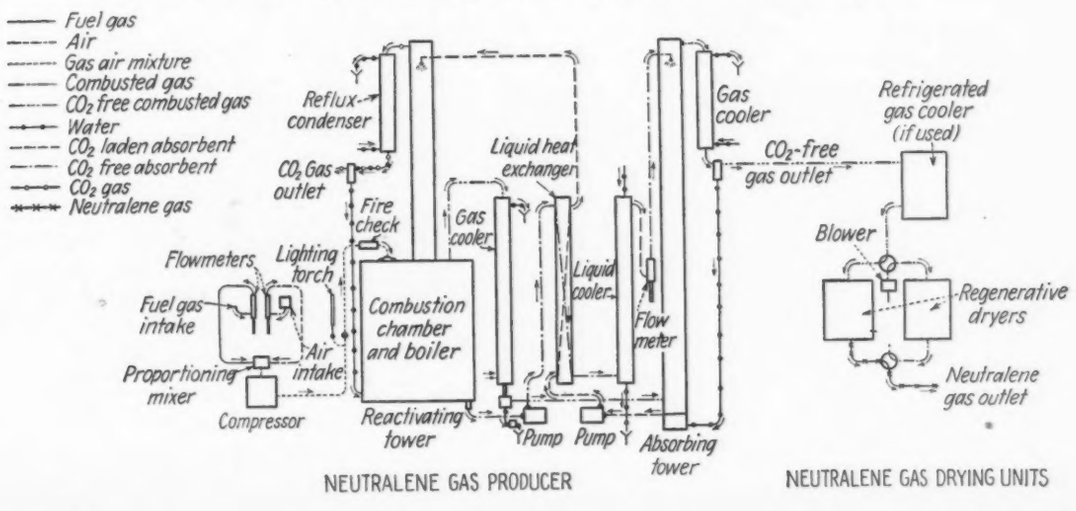


TABLE I

Approximate Composition and Cost of Producing Typical Furnace Atmospheres
(1000 cu ft per hr)

Item	Type of Equipment Used	Method of Producing	Atmosphere Analysis						Fuel Gas Consumption, Cu ft per hr		Electric Power, Kw-hr per hr	Cooling Water Gal per hr	Charcoal Lb per hr	Atmosphere Cost Per 1000 cu ft	
			CO_2	CO	H_2	CH_4	N_2	H_2O Dew Point	Coke Oven Gas	Natural Gas				Coke Oven Gas Fuel	Natural Gas Fuel
A	Atmosphere Gas Converter	Partial Combustion 6-1 Ratio[1]	5.0	10.0	15.0	1.5	68.5	Sat.	360	150	1.0	150	—	0.27	0.10
		Complete Combustion 10.25-1 Ratio[1]	11.5	0.7	0.7	0.0	87.1	Sat.	280	115	1.0 22.0	275 447	—	0.20 0.50[2]	0.08 0.32[2]
B	(1) Conventional Atmos. Gas Converter + CO_2 Remover + Dryers	Partial Combustion 6-1 Ratio[2]	0.0	10.5	15.5	1.5	72.5	−40° F	370	155	4.0 24.0	477 627	—	0.32[3] 0.47[2]	0.14[3] 0.33[2]
	(2) Neutralene Gas Producer + Dryers														
C	(1) Conventional Atmos. Gas Converter + CO_2 Remover + Dryers	Nearly Complete Combustion 9.5-1 Ratio[1]	0.0	2.0	2.0	0.0	93.0	−40° F	280	125	4.0	627	—	0.27[3]	0.13[3]
	(2) Neutralene Gas Producer + Dryers														
D	Electrically Heated Catalyst Converter	Endothermic Reaction 2.5 -1 Ratio[1]	0.0	19.0	33.0	1.5	41.5	−10° F	410	200	12.0	100	—	0.42	0.22
E	Dryolene Producer	Complete Combustion (Water Removed) Converted by Charcoal	0.0	20.0	3.0	0.0	77.0	−20° F	380	170	1.0	370	3.7	0.39	0.22
		Complete Combustion Converted by Charcoal	0.0	30.0	13.0	0.0	54.0	−15° F	425	190	1.0	—	7.5	0.53	0.32
F	Ammonia Dissociator	Dissociation of NH_3	0.0	0.0	75.0	0.0	25.0	−60° F	22.2 lb=NH_3		17.0	—	—	0.95 to	2.50

[1] Air to gas ratios are for natural gas. For coke-oven gas, multiply above ratios by 0.5. For propane, the ratios are approx. 2 times those given above and for butane about 3 times.
[2] Electrically heated CO_2-remover and dryer.
[3] Electrically heated dryer.
[4] Costs include only materials consumed. They do not include factors for obsolescence, installation or maintenance. Estimates have been based on the following unit costs: Natural gas—50¢ per 1000 cu ft; coke-oven gas—70¢ per 1000 cu ft; electric power—1¢ per kw-hr; water—5¢ per 1000 gal; charcoal—3¢ per lb; and ammonia—3.5¢ per lb in tank cars, 15¢ per lb in cylinders.

gas, water and drain connections. Tops of the two towers, and the three heat exchangers, are dismantled for shipment but are easy to install.

All heating is accomplished by means of previously wasted energy, thereby saving approximately 18 kw-hr per 1000 cu ft of atmosphere produced. Estimating the cost at 1¢ per kw-hr, a saving of about $1080 per 6000-hr operational year, or about $5400 in 5 yr is realized with a 1000 cu ft per hr unit.

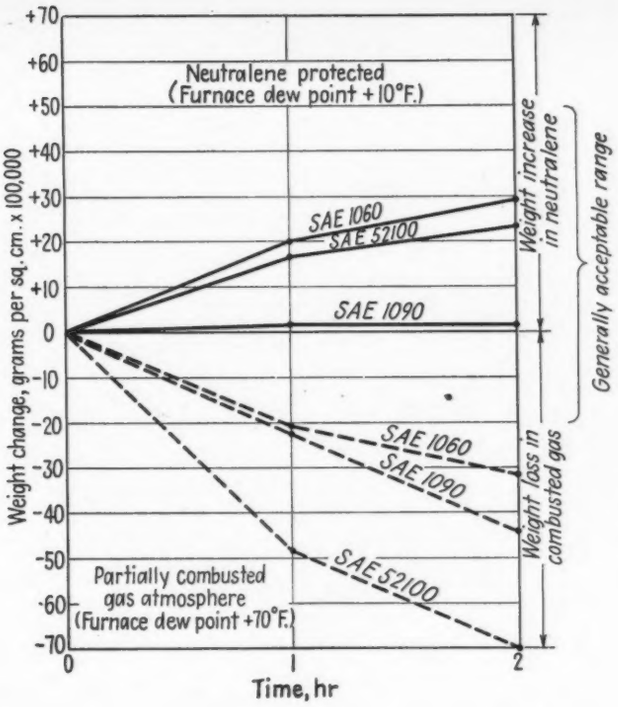
These savings are detailed in table I. The low ratio atmosphere gas converter, CO_2-remover, and dryer, table I (item B1), has a power consumption of 22 kw-hr per hr for 1000 cu ft per hr output, and an overall operating cost of 32¢ per 1000 cu ft, based on assumed costs of materials indicated below the table. The Neutralene gas producer and dryers, table I (item B2), of the same rating have a power consumption of only 4 kw-hr per hr and total operating cost of 14¢ per hr. This reduction from 32¢ to 14¢ is therefore the direct result of saving 18 kw-hr in redesigning the equipment.

Further, close control of the heat input to the boiler was considered formerly desirable for purposes of economy. Now that energy otherwise wasted is employed, the temperature control is not necessary.

Combination of the atmosphere gas converter and CO_2 remover into a single unit has reduced by 67 pct the floor space occupied by this portion of the 1000 cu ft per hr equipment. Inasmuch as the auxiliary drying units occupy the same space in either case, when they are included the overall space saving is 55 pct. A floor layout of (1) a conventional atmosphere gas converter, CO_2-remover, refrigerated gas cooler, and regenerative dryer, with the converter and CO_2-remover occupying approximately 75 sq ft of floor space and the complete equipment 116 sq ft; and (2) the Neutralene producer occupying 31.5 sq ft and the Neutralene producer with auxiliary drying units 52.5 sq. ft, is typical. This space saving results from elimination of the separate atmosphere gas converter by building the combustion chamber into the reactivating tower, and also because the combustion chamber, the two surface coolers, and the heat exchanger are mounted vertically instead of horizontally.

Table I lists various types of atmosphere producing equipments with analyses, cost, and other data on gases they produce. Table II lists the various types of heat treatments for which furnace atmospheres are commonly employed on various metals and indicates the furnace atmosphere recommended for each of these applications. The ideal furnace atmosphere is, of course, one which will not change the surface condition of the metal being treated, such as by oxidation, decarburization or carburization (unless the requirements call for it as in gas carburizing). But no one gas atmosphere will do this for all metals, because of the varied requirements of atmosphere with respect to reducing properties, and/or the carbon potential necessary for different processes. Table II outlines these varied requirements for different metals and indicates that there are generally one or two types of atmospheres which will meet them. An atmosphere gas producer with enough flexibility to meet several of these requirements is, of course, desirable. The Neutralene gas producer has considerable versatility in that respect.

The Neutralene gas producer is available in two types; the low-ratio type, table I (item B2), for partial combustion of hydrocarbon gases, and the high-



ABOVE

FIG. 4—Results of weight-change tests conducted on SAE 1060, 1090 and 52100 steels.

RIGHT

FIG. 5—Curves showing slight carburizing action of CO_2-free, dry combusted gas including CH_4 and the increasing decarburizing action with increasing CO_2 and in some cases H_2O_2.

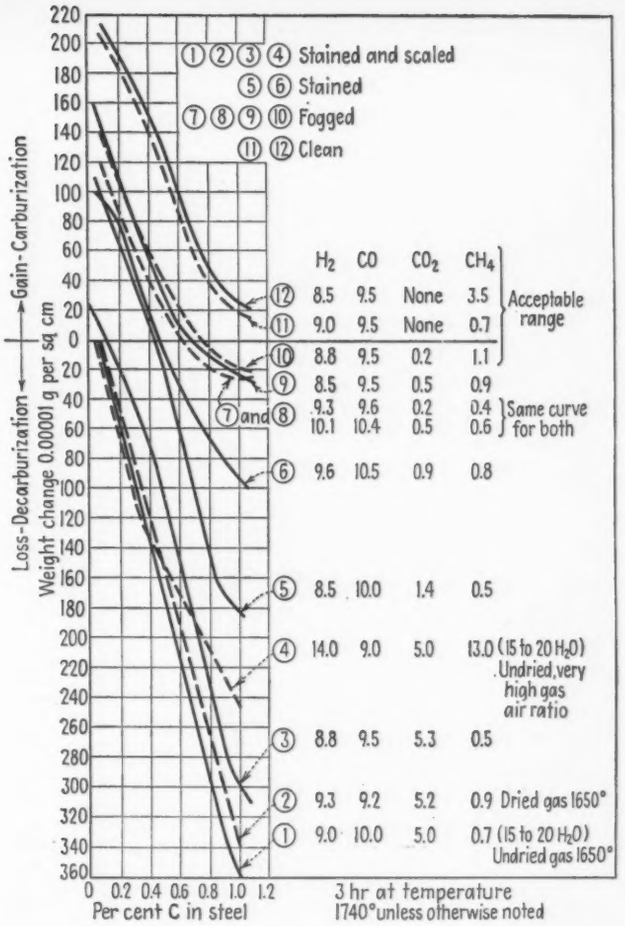
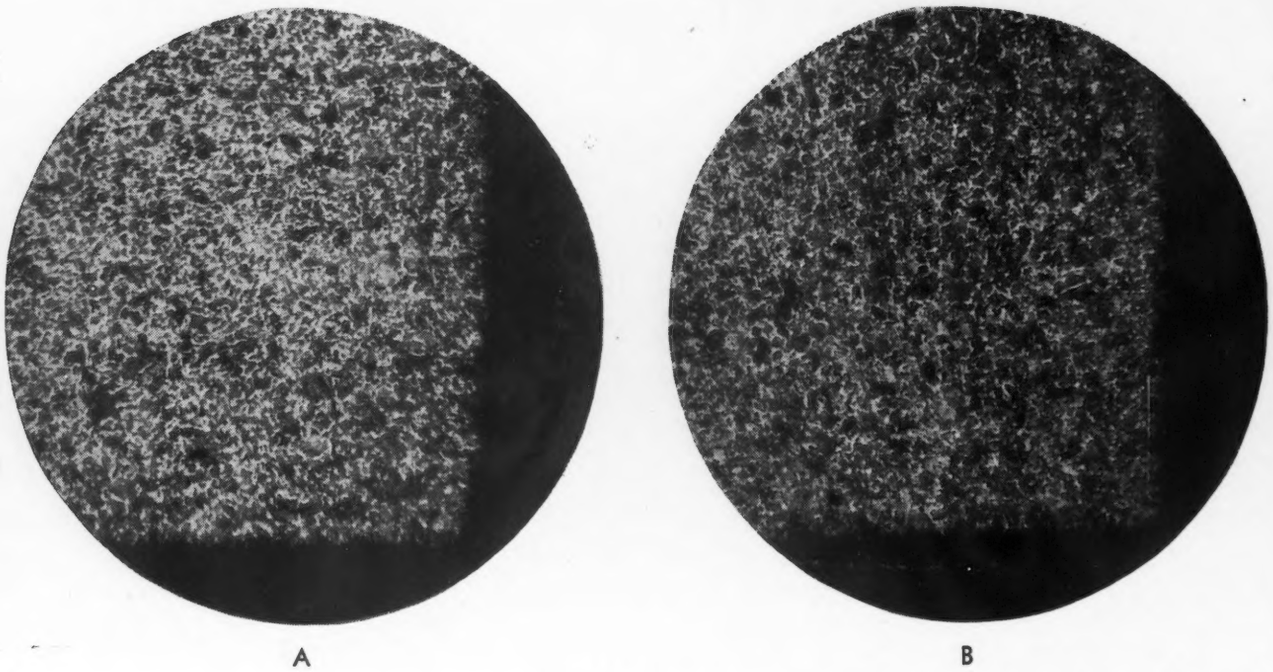

① ② ③ ④ Stained and scaled
⑤ ⑥ Stained
⑦ ⑧ ⑨ ⑩ Fogged
⑪ ⑫ Clean
Loss-Decarburization ← Gain-Carburization
Weight change 0.00001 g per sq cm
H2 CO CO2 CH4
⑫ 8.5 9.5 None 3.5
⑪ 9.0 9.5 None 0.7
Acceptable range
⑩ 8.8 9.5 0.2 1.1
⑨ 8.5 9.5 0.5 0.9
⑦ and ⑧ 9.3 9.6 0.2 0.4
10.1 10.4 0.5 0.6
Same curve for both
⑥ 9.6 10.5 0.9 0.8
⑤ 8.5 10.0 1.4 0.5
④ 14.0 9.0 5.0 13.0 (15 to 20 H2O) Undried, very high gas air ratio
③ 8.8 9.5 5.3 0.5
② 9.3 9.2 5.2 0.9 Dried gas 1650°
① 9.0 10.0 5.0 0.7 (15 to 20 H2O) Undried gas 1650°
Per cent C in steel
3 hr at temperature 1740° unless otherwise noted

TABLE II

Heat Treatment Processes and Furnace Atmospheres Recommended for Them

Heat Treatment	Metal To Be Processed	Requirements: Metallurgical	Requirements: Surface	Temperature Range, °F	Furnace Atmosphere Recommended
Annealing	Low Carbon Steel	—	Bright	1200–1350	1a
	Medium & High Carbon Steel	No Decarburization	Bright	1200–1450	2a or 2b*
	Alloy Steel, Medium & High Carbon	No Decarburization	Clean or Bright	1300–1600	2a or 2b*
	High-Speed Steels	No Decarburization	Clean	1450–1650	2a or 2b*
	Stainless Steels	—	Bright	1800–2100	4
	Copper	—	Bright	500–1200	1b
	Copper Nickel Alloy	—	Bright	800–1400	1a
	Brasses	—	Clean	600–1400	1b or 2b
Normalizing	Low Carbon Steel	—	Bright or Clean	1600–1850	1a
	High Carbon Alloy Steel	No Decarburization	Bright or Clean	1500–2000	2a
Hardening	High Carbon & Carburized Steels	No Decarburization	Bright or Clean	1400–1750	2a or 3
	Alloy Steels—Medium & High Carbon	No Decarburization	Bright or Clean	1400–1750	2a or 3
	High-Speed Tool Steels	No Decarburization	Bright or Clean	1800–2400	2a or 3
Brazing	Low Carbon Steel	Copper Braze	Bright	2050	1a
	Medium & High Carbon or Alloy Steels	Copper Braze No Decarburization	Bright	2050	2a or 3
	Stainless Steels	Copper Braze	Bright	2050	4
	Low Carbon Steel	Silver Braze	Bright	1100–1600	1a
	High Carbon Steels	Silver Braze	Bright	1100–1600	2a or 3
	Copper or Brass	Silver Braze	Bright or Clean	1100–1600	1b or 2b
Sintering	Low Carbon Ferrous Metals	Sintering	Bright or Clean	1800–2100	1a
	High Carbon Ferrous Metals	Sintering	Bright or Clean	1800–2100	2a or 3
	Non Ferrous Metals	Sintering	Bright or Clean	1400–1800	1a
	Tungsten	Sintering	Bright or Clean	2150–2500	4
Carbon Restoration	Decarburized Steel	Carbon Replacement	Clean	1500–1700	2a
Carburizing	Carburizing Steels	Gas Carburizing	Clean	1400–1800	2a or 3

1a—Products of partial combustion from atmosphere gas converter.
1b—Products of complete combustion from atmospheric gas converter.
2a—Neutralene (CO_2 free and dry), partial combustion.
2b—Neutralene (CO_2 free and dry), complete combustion.
3 —Drycolene.
4 —Dissociated ammonia.
*Application determines whether partial or complete combustion.



A B

FIG. 6—Micros (A) and (B) illustrate effects of heat treating SAE 1060 steel
Micros (C) and (D) illustrate effects of heat treating in combusted gas

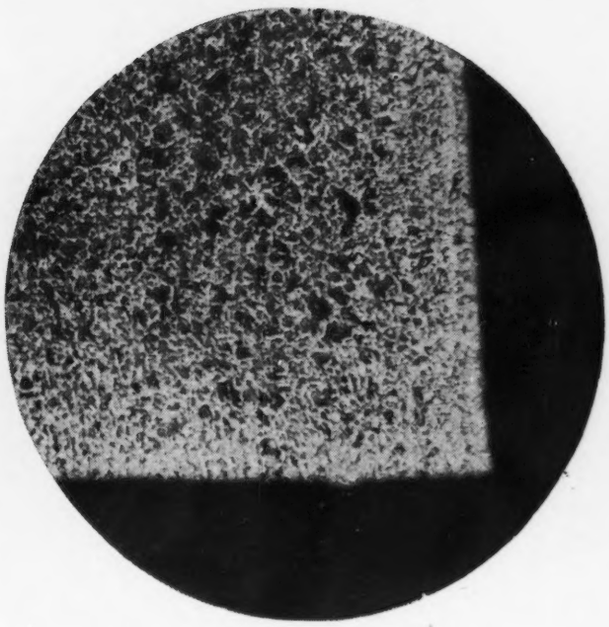
ratio type table I (item C2), for complete combustion. The analysis of output gas from either type can be adjusted over a reasonably wide range. Because of the reducing and carbon potential requirements, low-ratio Neutralene is dictated for short cycle annealing, clean hardening, and furnace brazing of medium and high carbon steels. This atmosphere consists of approximately 10.5 pct CO, 15.5 pct H_2, 1.5 pct CH_4, 72.5 pct N_2, dewpoint —40° F. Other uses for this low-ratio Neutralene are: hardening of high-speed steels (both preheat and high heat furnace), sintering of high carbon ferrous metals, carbon restoration to decarburized surfaces, and as a carrier gas for propane or natural gas in gas carburizing. On the other hand, the high-ratio Neutralene is dictated for long cycle annealing of low, medium, and high carbon steels and for annealing brass, in bell type furnaces. This atmosphere is approximately 2 pct CO, 2 pct H_2 and 96 pct N_2, with a dewpoint of —40° F.

Laboratory tests have proved that Neutralene gas is excellent from the standpoint of surface decarburization. Typical tests which have been made are:

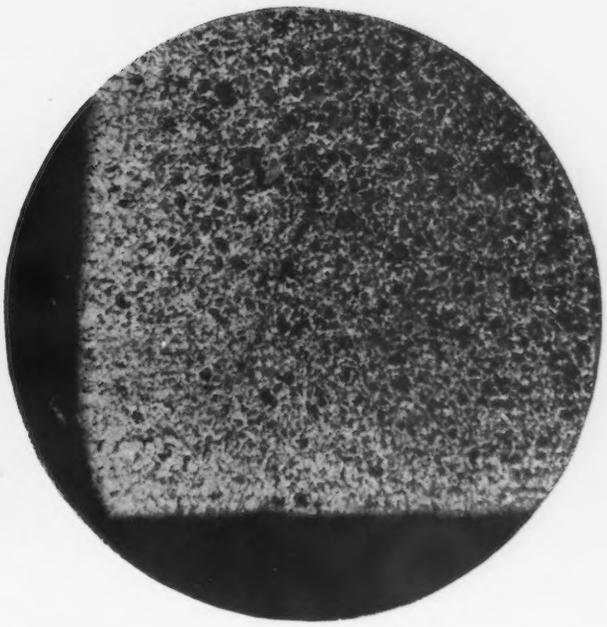
Weight-change test—A change in carbon content of steel due to heat treatment can be determined by

FIG. 7—Micros (A) and (B) illustrate effects of heat treating SAE 1090 steel
Micros (C) and (D) illustrate effects of heat treating in combusted gas

A B



C



D

in Neutralene at 1500°F for 1 and 2 hr respectively, furnace dew point +10°F. for 1 and 2 hr respectively at 1500°F, furnace dew point +70°F. X100.

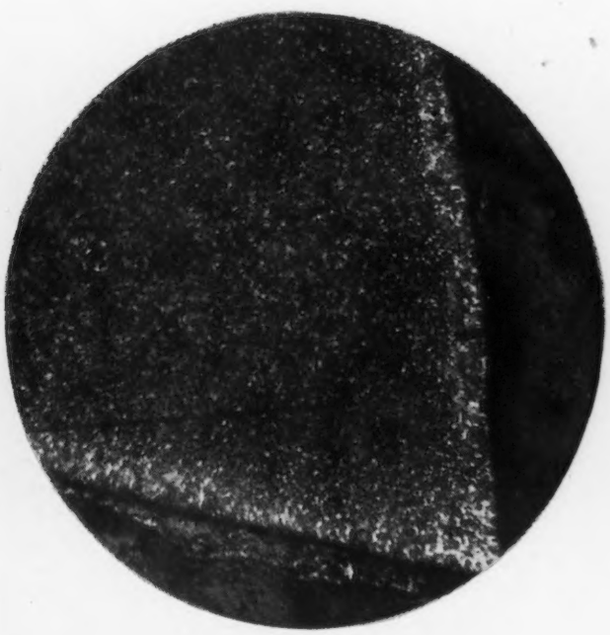
weighing carefully prepared test samples on a chemical balance before and after heat treatment. A loss in weight indicates decarburization and an increase in weight indicates carburization (if the samples are protected against oxidation when removed from the furnace).

Fig. 4 shows results of weight-change tests on SAE 1060, 1090, 52100 steels. The samples were held in a box-type electric furnace with open brickwork lining for 1 and 2 hr, at 1500° F, then pushed into the water-jacketed cooling chamber and cooled in the same atmosphere as the one in which they were heated. One set of samples was treated in a low-ratio Neutralene atmosphere and another set in a low-ratio combusted gas atmosphere to provide a comparison. The samples treated in Neutralene showed a slight increase in weight, indicating some carbon pickup, while the samples treated in combusted gas showed quite a sharp decrease in weight, indicating decarburization.

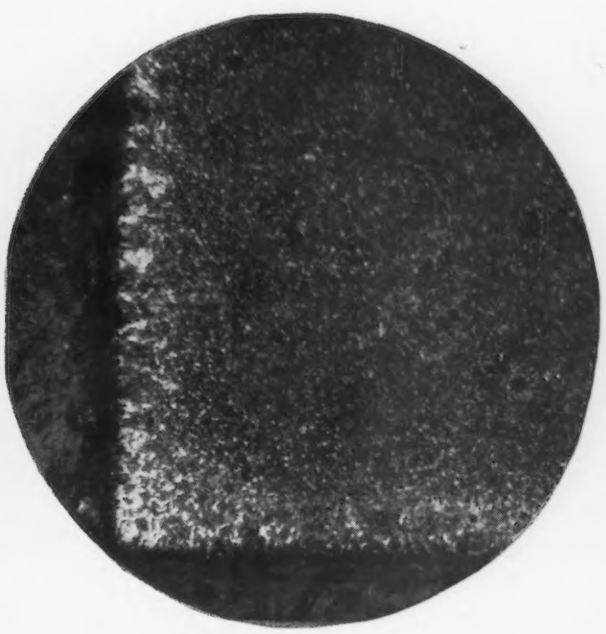
The Neutralene-treated samples are well within the generally acceptable range of weight change of —20 to +50 g per sq cm (X 100,000) as indicated by the bracket at the extreme right in fig. 4. However, the carbon pickup of SAE 1060 52100 steels can be re-

in Neutralene at 1500°F for 1 and 2 hr respectively, furnace dew point +10°F. for 1 and 2 hr respectively at 1500°F, furnace dew point +70°F. X100.

C



D



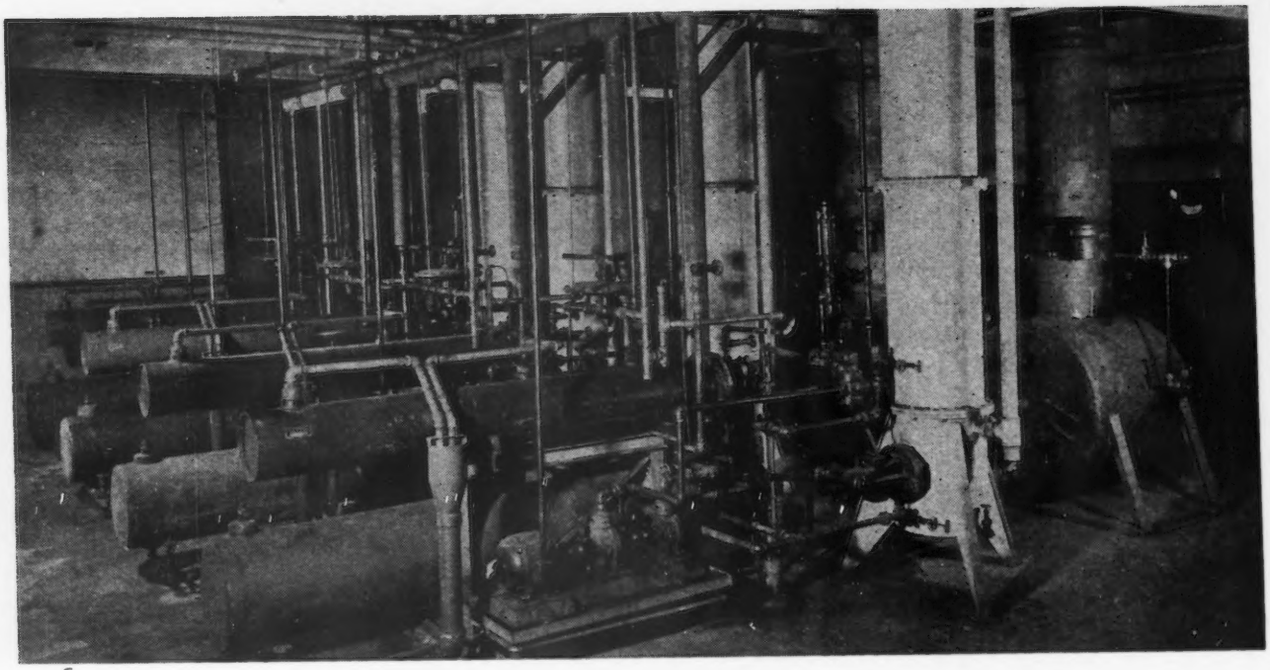


FIG. 8—A typical central atmosphere gas producing plant showing four GE CO_2-removers, each rated at 4000 cu ft per hr output. Heat exchangers and pumps are shown at the left, absorbing towers in the center (light color), and 46 kw regenerating towers in the background (dark color).

duced by; (1) changing the combustion air-gas ratio, or (2) bypassing some moist combusted gas around the dryer to increase the dewpoint within the furnace.

Gonser[1] also graphically illustrated the need for CO_2-free, dry combusted gas to prevent surface decarburization, in his curves shown in fig. 5. Steel samples containing carbon varying from 0.10 to 1.0 pct or higher were treated for 3 hr at 1740°F, unless otherwise noted on the chart. The furnace atmosphere was low-ratio combusted gas, with or without purification. In two cases, (samples Nos. 11 and 12) the CO_2 was removed to 0.0 pct while for the other cases, (samples Nos. 1 to 10) the CO_2 was gradually increased up to 5.3 pct. In most cases the gas was completely dried but in a few cases it was undried. Usually the CH_4 content was less than 1 pct. It will be noted that the best results were obtained with 0.0 pct CO_2 (curves 11 and 12). Regardless of the amount of carbon in the steel, parts were carburized as indicated by weight increases and there was no sign of decarburization. However, as soon as CO_2 was introduced, and, in some cases H_2O, decarburization was evident as indicated by weight loss; and the weight loss increased as the CO_2 and, in some cases the H_2O, increased. This comparison shows the superiority of CO_2-free, dry combusted gas, by means of the excellent results indicated in curves 11 and 12.

TABLE III

Comparative Hardness Readings of Samples Treated in Neutralene and Combusted Gas Atmospheres

	1 Hr in Heat[1]				2 Hr in Heat[1]			
	Neutralene Atmosphere		Combusted Gas Atmosphere		Neutralene Atmosphere		Combusted Gas Atmosphere	
Steel Code, SAE	A	B	A	B	A	B	A	B
1060	62	63	53	47	63	65	51	41
1090	66	67	63	60	66	67	62	58
52100	65	66	61	60	66	67	60	58

A. Direct Rockwell "C" hardness.

B. Rockwell 15 N "Superficial" hardness converted to "G" Scale.

[1] Period of time samples were in furnace for weight change test. Reheated for 20 min at 1500°F, then oil quenched to obtain hardness data.

Photomicrographs—Photomicrographs provide another test frequently used for detecting surface decarburization. Comparison between SAE 1060, 1090, 52100 steels, as treated in low-ratio Neutralene and as treated in partially combusted gas under identical conditions, are illustrated in figs. 6 and 7. For the photomicrographs, small pieces were cut from the weight change specimens used in fig. 4. No surface decarburization can be detected in the photomicrographs of the samples treated in Neutralene; but the white band at the surface of those treated in combusted gas shows carbon-free ferrite and indicates decarburization.

File hardness test—The file hardness test is a comparison of the hardness of a part with the hardness of a file. One can feel a file cutting through a decarburized soft skin of a hardened part; but when the surface hardness of the part equals that of the file, the file does not cut and skids over the surface freely. Parts that should be file-hard after hardening, are file-hard when treated in Neutralene.

[1] *B. W. Gonser "The Status of Prepared Atmospheres in the Heat Treatment of Steels", Industrial Heating, December* 1939, *p.* 1123.

[2] *E. E. Slowter and B. W. Gonser "Comparative Effects of Controlled Atmospheres on Alloy and Carbon Steels", Metals and Alloys, February and March* 1938.

Rockwell hardness test—Serious decarburization can be detected by a standard hardness tester. Slight decarburization may not be indicated by such a tester but may be revealed by comparison readings between a Rockwell standard machine and a Rockwell "superficial" machine.

A comparison test on Neutralene-protected samples of representative medium and high carbon steels such as SAE 1060, 1090, and 52100 steels resulted in the record shown in table III. After small pieces were cut from the weight-change samples for making the photomicrographs (figs. 6 and 7), hardness tests were conducted on the remaining parts. These specimens were placed in the box type furnace for 20 min at 1500° F either in Neutralene or combusted gas atmosphere depending upon which atmosphere they had been exposed to during the weight change test. Then they were transferred through air to an oil quench.

Table III shows that in all the tests on the Neutralene protected samples, the R15N readings converted to RC were greater than the direct RC readings, indicating that no surface decarburization had occurred. However, tests on the samples treated in combusted gas gave readings on the R15N scale, which when converted to RC were less than the direct RC readings, indicating that surface decarburization had occurred.

These comparative tests on samples treated in Neutralene and combusted gas atmospheres show the effectiveness of Neutralene for heat treating medium and high carbon steels without decarburization.

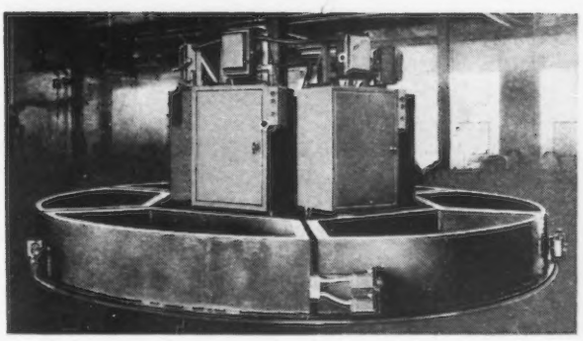
In addition to the highly purified CO_2-free, dry combusted gas normally drawn from the Neutralene producing equipment, other gases with lesser degrees of purification can be taken. For example, raw combusted gas can be tapped off for use in some furnaces or processes; and at other stages, CO_2-free, combusted gas or CO_2-free, refrigerated gas, can be taken. The raw combusted gas is especially suitable for short cycle annealing and normalizing of low carbon steels, furnace brazing of low carbon steels and nonferrous metals, and sintering of low carbon ferrous metals and of nonferrous metals.

Because these various gases can be drawn from a single unit, the Neutralene gas producing equipment is well adapted for service as a central atmosphere gas-producing plant. These central plants have shown numerous advantages over small gas producers with individual furnaces. One large unit has lower initial cost and installation cost than several small ones. The large unit running continuously under supervision of one operator supplies the same uniform gas to all furnaces at all times, thus contributing to uniformity of the products. Operating and maintenance costs are slightly lower in a large unit than in several small ones, and one large unit takes less floor space than several small ones. Fig. 8 shows a typical central atmosphere gas-producing plant which in this case includes four large conventional CO_2-removal equipments supplying a number of furnaces located some distance from the gas unit.

Welding Rod Casting Machine

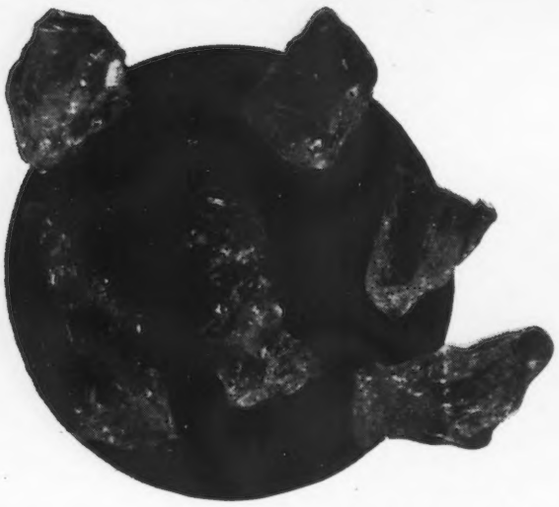
A SIX-spindle centrifugal casting machine for the production of welding rods, having a reported output of approximately 1500 lb per hr of cast welding rods, has been developed by the Centrifugal Casting Machine Co., Tulsa, Okla. This unit, which is now in production on high alloy cast welding rods, can also be used for other types of production centrifugal casting, the company asserts.

This machine, shown in the accompanying illustration, is the turntable type, having six individual spindles mounted on one turntable, and automatically brings each spindle in turn to the pouring station, the casting removal station and the mold preparation station.



While the production rate of the machine can be varied and is determined by the size of rod produced, a production of approximately 1500 lb per hr of finished rods is obtained. The rods require no sand blasting or other type of cleaning other than the removal of fins which occasionally occur. The rejection losses, due to defectively cast rods, are negligible. The turntable proper is approximately 14 ft in diam, and is driven by means of a chain drive, through a reduction gear and variable speed motor unit. The speed of the turntable may be varied from ½ to 2 rpm. The turntable drive mechanism is provided with controls which cause each spindle to be stopped at its proper station for the various operations incidental to making the castings. To accomplish this, provision is made for the table to stop at each 60°, delay at each stop for a preset period of time, then move on to the next stop. This permits each spindle to be stationary, that is, not moving, during each casting operation. It is possible, however, to adjust the controls so that the turntable will rotate continuously at a desired rate of speed. Such procedure is desirable for certain types of casting operation.

Each of the six spindles is equipped with a separate 5-hp electronically controlled variable speed driving unit, having a continuously variable speed range from 0 to 600 rpm. Electrical controls for these units are so adjusted that each spindle comes to speed immediately before reaching the pouring position and remains spinning through this pouring position by means of an eddy-current brake. The operation of the machine is entirely automatic.



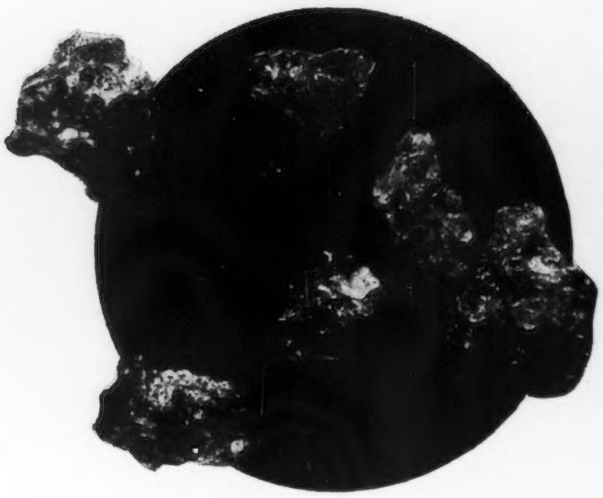


FIG. 1—A comparison of surfaces of 38 and 32 Alundum No. 24 grains. Illustration at left shows the 38 Alundum, with its characteristic smooth faces and continuous edges. Illustration at right is the new 32 Alundum abrasive, showing the nubbliness of the surfaces and the more numerous faces, points and edges. Both illustrations X20.

New Abrasive Reduces

A SIGNIFICANT new development in the field of abrasive materials which, on the basis of extensive tests in the field, promises longer lasting abrasive wheels, fewer redressings, heavier down feeds, and cooler cutting has been announced by Norton Co., Worcester, Mass. The new abrasive is of the fused alumina or aluminum oxide type and is identified as 32 Alundum.

For the most desirable abrasive, there are two essential properties that an abrasive grain must have. It must be hard enough to penetrate the work repeatedly and become dull slowly. Then, when it has become dull, it must fracture in such a manner as to present new and sharp cutting points to the work.

To meet the requirements of grinding applications which can be handled by fused alumina wheels, several types of this class of abrasive have been developed and are in general use. Typical of these fused alumina abrasives are Norton's regular Alundum, the 38 Alundum and the 57 Alundum. These fused alumina abrasives are cooled from fusion in the electric furnace in large masses which must be crushed and milled to grain form by mechanical means. The final grain form varies according to the way milling is performed. However, in all cases the external faces and edges of the grain are the result of fracture. Each grain is bounded by relatively few surfaces that are essentially smooth though curved, and not flat. The edges are continuous though not straight. Serrated edges and granular faces are quite uncommon.

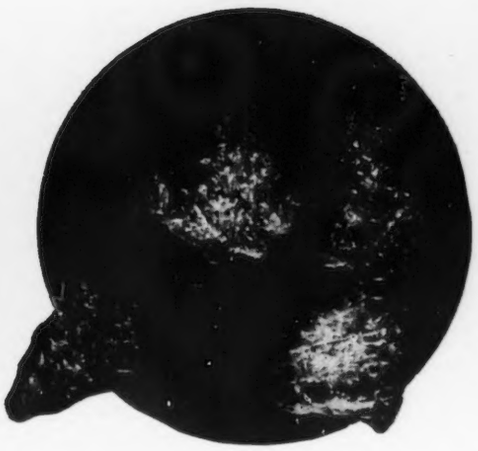
In contrast, 32 Alundum crystals are formed in the electric furnace as substantially pure aluminum oxide (99.5 pct), without slag or pores, grown in a decomposable matrix which serves to absorb the impurities remaining at the time of crystallization and to release individual crystals after a chemical leaching process. The external faces of these grains, which require no milling, contain many faces which are characteristically nubbly and show many exterior and re-entrant angles acting as rake angles to improve abrasive efficiency. A comparison of 38 and the new 32 Alundum grains is given in fig. 1. A comparison of the internal structures of 38 and 32 Alundum is given in fig. 2. Even in the coarsest commercial size of this new abrasive, each particle comprises a single crystal.

Based on the facts presented, the following theory has been advanced by Norton's engineers for the desirable abrasive action of 32 Alundum: The nubbliness of these grains makes for better bonding and for many cutting granules which allow individual grains to penetrate the work more deeply. The high purity of the crystal is believed to retard dulling of the cutting points. However, when dulled, the grain fractures repeatedly along the impurity films and stringers to expose new cutting points.

Results of Field Tests

The results of a year of field tests in 24 grinding classifications have indicated that 32 Alundum wheels are fast and cool cutting, require less frequent redressing, permit heavier grinding cuts and wear longer. Although during its early development the new abrasive had not been expected to find a place in heavy duty applications such as snagging, the field tests have shown that it is faster cutting than either regular or 57 Alundum.

In offhand grinding of tools, forgings and steel castings, where vitrified or resinoid wheels may be used,



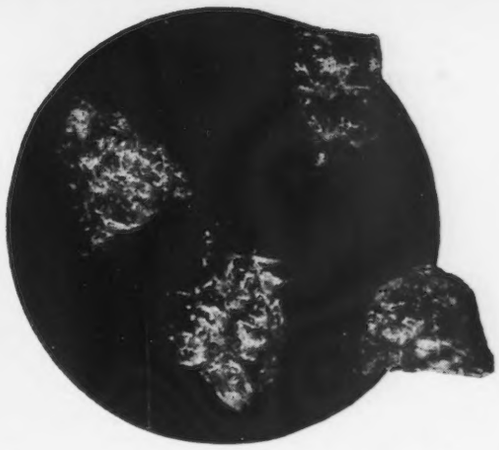


FIG. 2—A comparison of internal structure of 38 and 32 Alundum No. 24 grains. View on left shows the bubbles and elongated capillaries characteristic of the 38 Alundum abrasive. Illustration at right shows the uniform distribution of films and stringers throughout each crystal of the new 32 Alundum abrasive. Both illustrations X20.

Grinding Costs . . .

By JOHN ANTHONY
Eastern Regional Editor

Extended field tests on a new type of fused alumina abrasive indicate the possibilities for lowered cost in grinding operations. Advantages of this new abrasive include the need for fewer redressings and cooler and faster cutting. In addition to a discussion of the results of comparative tests, outstanding features that give to the new wheel its unusual performance are included.

operators find 32 Alundum wheels cut faster. In using portable grinding units with resinoid wheels or welds, steel castings and some billets, the new abrasive is said to penetrate the work more quickly despite the limited pressures used. Therefore it is recommended that wheels of the new abrasive be used that are one to three grades harder than previously specified in regular or 57 Alundum.

In toolroom grinding, 83 pct of the tests indicated 32 Alundum to be equal to or superior to any other abrasive, the company reports. The new wheel is said to cut cooler and stay as sharp as, or sharper than, 38 Alundum with less wheel wear, in addition to showing the resistance to point dulling and the long life of the tougher Alundum grades, but without their tendency to cause burning. If present wheels are regular or 57 Alundum, or are other than BE bond, or for special form grinding, one grit size finer and one or two grades harder is recommended. Where fine finish is important, one grit size finer and one grade softer than 38 Alundum is recommended.

Surface grinding on the edge face of ring wheels, cylinders or segments entails an extremely wide work-wheel contact area and an abrasive to be effective must stay extremely sharp. Dulling or glazing of the wheel to the slightest extent will produce overheating, burning and perhaps seizure. Field tests have shown that 32 Alundum wheels cut cooler and freer and require little or no dressing. Surface grinding on the periphery of the wheel is not as severe as edge face work, but the wheel face must stand up extremely well in order to produce flat work because of the small area of wheel-work contact.

The Heald Machine Co., Worcester, Mass., had the problem of surface grinding a low carbon cast iron flat core plate with many interrupted surfaces cored for grooves and holes, as shown in fig. 3. A 57 Alundum wheel required 6 to 7 redressings in order to grind both sides of the plate with a down feed of 0.001 in. With a down feed of 0.002 in., a 32 Alundum wheel required dressing only at the start and once before the final finish grind. The operation was done on a Mattison grinder, as illustrated in fig. 4, using a peripheral wheel 20 x 6 x 12 in. at 30 hp. The

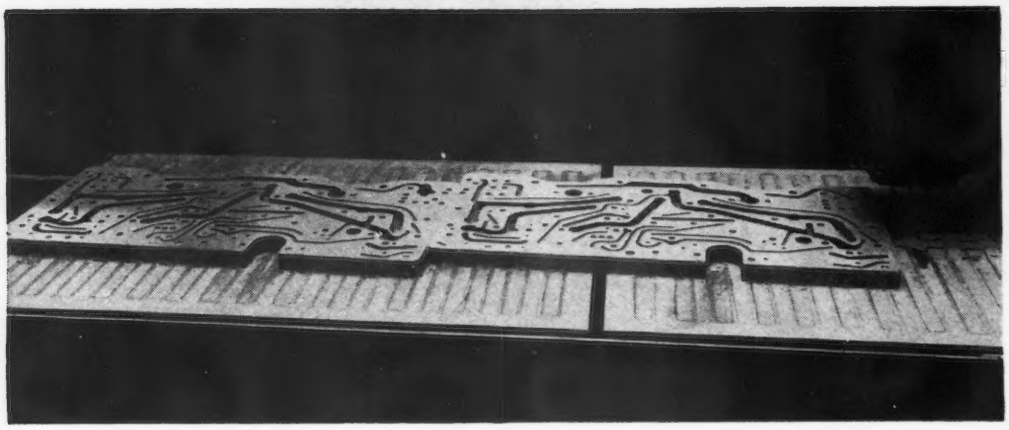


FIG. 3—Low carbon cast iron core plate with numerous interrupted surfaces on which the new abrasive showed a marked reduction in number of wheel dressings required and elimination of rounded edges, despite an increase of 100 pct in down feed.

floor time was cut in half, and even with the heavier down feed and fewer redressings, there were no rounded edges at the interrupted surfaces such as would be caused by a dull wheel.

In surface grinding of tool steels and sensitive high speed steels with a 38 Alundum wheel, the down feed is generally limited to 0.0005 in. in order to avoid cracks in the steel. A 32 Alundum wheel permits six times more rapid stock removal providing there is sufficient power behind the wheel. Down feeds of 0.002 to 0.003 in. are practicable.

Comparative tests on Wando oil hardened tool steel between a 38A46-J5VBE, until now the best wheel for the purpose, and a 32A46-J5VBE wheel, grinding dry with a specially heavy feed, offers a significant comparison between the abrasives. The wheels were of the same diameter and dressed alike; down feed was 0.100 in. and cross feed was 0.005 in. With the 38 Alundum wheel there were deep chatter marks and some burring of the steel and the wheel corner wear or bevel measured 2½ times that of the 32 Alundum wheel. Chatter marks, if any, from the latter wheel were within commercial finish tolerances and there was no burn. The corner stability of the 32 Alundum wheel indicated that the abrasive can be used to advantage for slot, fillet and shoulder grinding and will hold its diameter and corner with a minimum of dressing.

For cast iron plates surfaced on a Blanchard grinder, 32 Alundum segments offered service for 16 days in comparison with a previous maximum life of three days using other abrasive segments.

Internal grinding to close tolerances is a problem because the entering edge of the wheel tends to break down faster than the remaining surface and there is a tendency to grind a tapered hole. This is particularly critical on wheels of small diameter. W. H. Nichols & Sons, Waltham, Mass. was grinding holes ½ in. diam x ⅝ in. deep in a high carbon, high-chromium hardened steel pump part having a hardness of Rc56 to Rc57. The wheel was ⅜x⅜x⅛ in. (see fig. 5). The life of a 57 Alundum wheel was eight holes, with continual redressing required. The best competitive wheel was said to have lasted for 10 holes. The use of 32 Alundum stepped up the number of holes per wheel to an average of 30, and cut down the number of redressings required. Using a specially built internal grinding machine, the life of 32 Alundum wheels has been increased to 50 holes. More recent experience indicates the possibility of still better service record.

Manual dressing time for internal grinding wheels has been appreciably reduced due to the free cutting action of 32 Alundum. For example, an internal grinding operation on collet steel had previously required dressing the wheel for each piece ground. A 32 Alundum wheel required only one dressing for every third piece ground. In some cases it has been reported that dressing time has been reduced to as little as one-fifth that previously needed. In dressing the wheel it is not necessary to remove the entire top layer of abrasive. One quick pass of the diamond across the face of the wheel is sufficient to resharpen it.

In specifying 32 Alundum wheels on operations where surface finish is an important factor it should be recognized that the free cutting character of the abrasive is such that stock removal leaves noticeable grain marks on the work surface. Therefore it is desirable to specify a somewhat finer grit size than used in other abrasives. Where the somewhat coarser finish is not objectionable tests have shown the same grit size wheel in 32 Alundum to offer a significant improvement in wheel life.

Cams ground on a Cam-O-Matic machine using 32 Alundum wheels proved to be 0.0005 in. to 0.0006 in. leaner on the ramps than with regular Alundum wheels, a decided advantage. The 32 Alundum wheels conformed more closely to the master, produced a better finish on each cam, required less dressing and, by remaining sharp for a longer time, did not build up a back pressure. Test data indicate that wheel specifications should be two or three grades harder and have a finer grit size than other abrasive wheels. A

TABLE I

Recommendations for Selecting 32 Alundum Wheels for Foundry Use
Wheel Markings

Work	Resinoid Bond	Vitrified Bond
Floorstand		
Offhand tool grinding	32A30-Q5B5	32A30-P5VBE
Forgings	32A16-R4B7	32A30-P5VBE
Ax manufacturing	32A24-R5B7	32A36-T5V #6 Tr.
Plow parts	32A16-R4B7	32A16-S5V #6 Tr.
Steel castings	32A16-Q4B5	
Swing Frame		
Steel castings	32A16-R4B7	
Portable		
welds and castings (straight wheels)	32A16-S4B7	
Welds and castings (cup wheels)	32A16-R4B7	
Billets (straight wheels)	32A16-S6B7	

32A70-08B2 wheel wore only 0.001 in. in grinding 13 cams with 0.030 in. stock removal, compared with 0.005 in. wear with the standard A80-N8B2 wheel.

In Hemming grinding on high carbon steel knife blades, Hemming cylinders in vitrified bond operating in a Klotz machine offered three to four times the service life of the cylinders employing an organic bond. These tests were made at the Pal Blade Co., Holyoke, Mass. It is recommended that cylinders for the Hemming, Klotz and Bridgeport machines be specified one grade harder than normally required in a resinoid or vitrified bond and that somewhat finer grit sizes be used.

In crankshaft wheels, 32 Alundum shows an advantage when used with the A bond. At the Waukesha Motor Co., Waukesha, Wis., a 42x1.799x12 in. wheel of 32A46-N5VA was run against an A46-N5VA wheel of the same size. The 32 Alundum crankshaft wheel held up well on the corners, eliminated side wall burning and produced eight cranks per dressing compared with four cranks per dressing with the other wheel. It produced more than 100 cranks more than the other wheel.

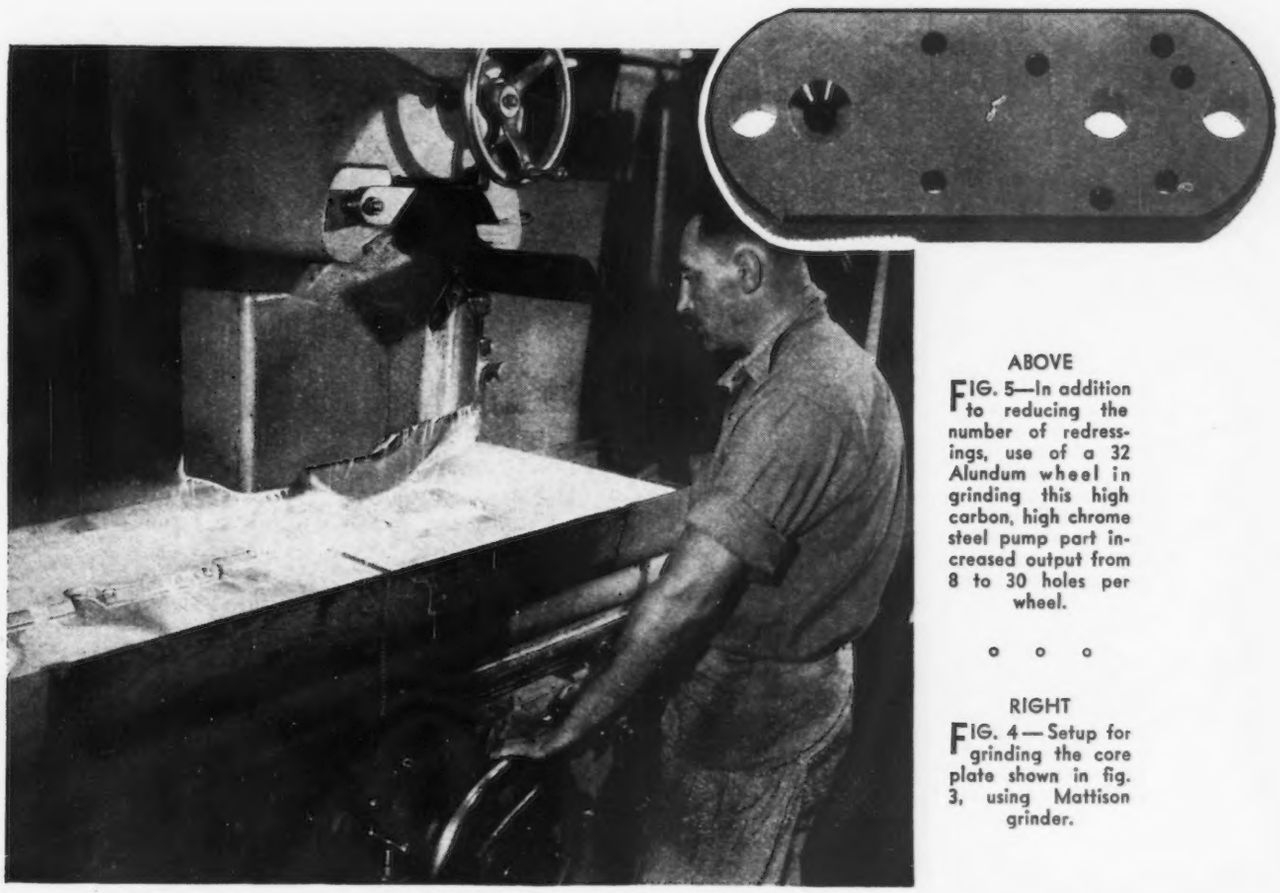
In centerless grinding, the 32 Alundum wheels offer extremely high stock removal capacity with exceptionally cool cutting action. When compared grit for grit there has been a slightly rougher finish. It would be desirable to specify one or two grades harder than 57 Alundum with BE bond. Recommendations covering the use of 32 Alundum wheels for foundry and toolroom grinding are given in tables I and II.

The Norton Co. expects to market the new abrasive only in the form of grinding wheels. It does not plan to license other producers.

TABLE II

Recommended Alundum Wheels for Toolroom Grinding

	Wheel Size	Wheel Markings
Cutters		
Staggered tooth—H.S.S.	3-2¼ x 1¼ x ½" ME 21560	32A46-K5VBE
Staggered tooth—H.S.S.	6 x ½ x ½" ME 19229	32A46-K5VBE
Milling—H.S.S. or Rexalloy	5 x 1½ x ½" ME 19243	32A60-K5VBE
Milling—Stellite	3¼-2⅛ x 1¼ x ½"	32A46-K5VBE
Rotary gear—tool steel	10 x 1 x 1¼" ME 9801	32A60-I12VBEP
End mills		
H.S.S.	6 x ½ x ½" ME 19229	32A60-I6VBE
H.S.S.	5 x 1½ x 1¼" ME 19243	32A60-J8VBE
H.S.S.	3-2¼ x 1¼ x ½" ME 21560	32A60-K5VBE
Hobs		
H.S.S.—B-C machine	10 x ⅝ x 1" B face	32A60-J5VBE
H.S.S.—U.T.D. machine	8 x ¾ x ¾" ME 12608	32A60-J12VBEP
H.S.S.—gear hobs	7 x ⅝ ¾" ME 12608	32A46-K5VBE
Reamers		
H.S.S. and molybdenum	8 x ½ x 1½"	32A54-K5VBE
H.S.S.—backing off	3 x 1½ x ⅞" ⅝" R ⅜" B	32A80-L8B5
Drills		
H.S.S.—offhand	7 x 1¼ x ⅞"	32A46-M5VBE
H.S.S.—pointing, Covell	10 x 1½ x 1" R 1/S 5½ x 1"	32A54-O7VBE
H.S.S.—backing off	8 x ⅜ x ½"	32A80-K6VBE
H.S.S—Sellers	5 x 1½ x 1⅛" R 1/S 3½ x 1"	32A80-J5VBE
Tools		
Hardened steel	8 x ½ x 1¼"	32A46-I8VBE
Misc.—floor stand	12 x 2 x 1¼"	32A36-Q5VBE
Boring tools—H.S.S	4-3 x 1½ x ¾" ME 19237	32A54-J5VBE
Tool bits—Stellite	4-3 x 1½ x ¾" ME 19237	32A46-J5VBE
Broaches		
H.S.S.	8 x 1 x 1¼"	32A80-G12VBEP



ABOVE

FIG. 5—In addition to reducing the number of redressings, use of a 32 Alundum wheel in grinding this high carbon, high chrome steel pump part increased output from 8 to 30 holes per wheel.

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FIG. 4—Setup for grinding the core plate shown in fig. 3, using Mattison grinder.

20-Million Volt Betatron

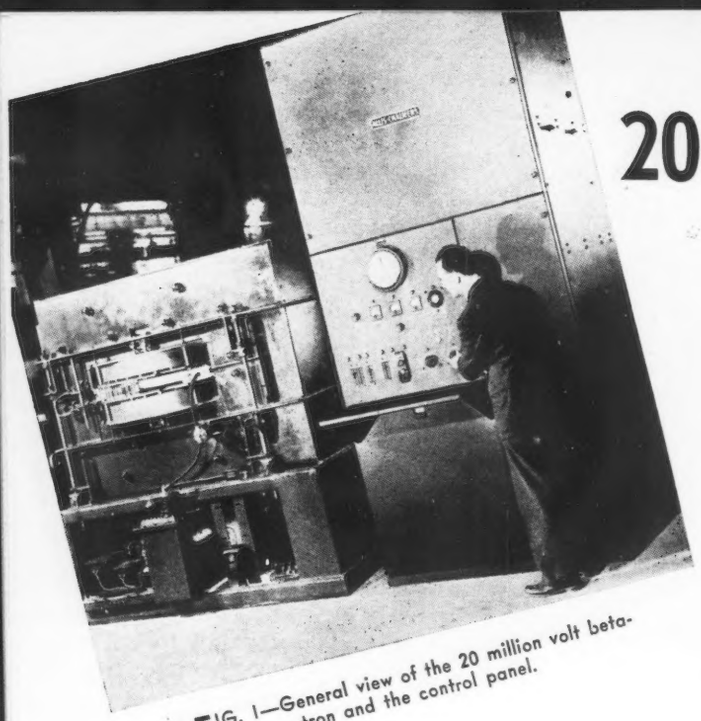

FIG. 1—General view of the 20 million volt betatron and the control panel.

PURSUING the theory of accelerating electrons by magnetic induction rather than by direct application of high potential, the Allis-Chalmers Mfg. Co., in cooperation with Dr. D. W. Kerst of the University of Illinois, disclosed last week the latest equipment for highspeed radiography, the 20-million v betatron, at a demonstration of the installation at the U. S. Army Picatinny Arsenal, Dover, N. J. Various views of the betatron are shown in figs. 1 and 2. The 20-million v unit was decided as having the most optimum radiographic properties, since smaller units lack the needed penetrating power and sharp focus, while larger sizes become unwieldy, with little gain in heavy section radiography. The betatron is essentially a variation of a simple two-winding transformer, with a low voltage heavy conductor primary, a shell-type steel core and a secondary. The secondary high voltage winding, however, has been replaced by a simple donut-shaped vacuum tube, instead of being made up of hundreds of thousands of turns of very small wire (which would be necessary to produce 20 million v). Projecting into the tube is a sturdy filament and a tiny platinum target.

In a conventional transformer, a voltage fed into the primary winding induces a flux in the iron core, which in turn causes electrons to travel through the turns of the secondary winding, resulting in a voltage appearing across the secondary terminals. In the betatron, when a rich supply of electrons is projected from the filament into the vacuum inside the donut, the magnetic flux acts on the electrons in much the same manner as if they were moving inside the turns of wire. A small air gap in the center leg of the core allows for insertion of the donut and a specially designed circular steel pole piece. As the flux surrounding this circular pole piece builds up, it acts to keep the electrons in a circular orbit, and at the same time it accelerates them.

In the 1/720 of a second that this action takes place, the electron stream races around the center of the donut several hundred thousand times, nearly approaching the speed of light. At the peak of travel speed, a pulse of current, from an electronic circuit in the betatron controls, upsets the magnetic field and the electrons spiral off and collide with the tip of the small target.

A number of particular advantages are realized from the use of higher voltage X-ray equipment. As the accelerating voltage used to generate X rays is increased, the frequency increases, and the wave length of the radiation decreases. The rate of absorption is very high at low frequency (long wave lengths—low voltages) and decreases with increasing voltages until a minimum absorption is passed, and it then again rises. Thus, if the radiation of an X-ray machine includes wave lengths of minimum absorption, the penetration of that radiation is maximum. The 20-million v choice for peak X-ray voltage provides the greatest source of radiation where needed most, since the richest portion of the most useful X rays are found in the band slightly below 10-million v.

The betatron is not considered practical for work less than 3 or 4 in. thick. The maximum practical thickness has not yet been determined, although X-ray inspection has been successfully accomplished for material 20 in. thick.

The focal spot of the betatron is smaller than the head of a pin, and most of the rays emerge in a cone-shaped zone. The cone is of sufficient size so that standard 14 x 17 in. film will be well covered at 8 ft from the target, with nearly uniform density on the film. Material can be examined within 3 ft of the target without serious density variations in the film. By placing the film at some distance behind the object to be inspected, the enlargements can be made on the film directly. This is a distinct advantage where clearances must be checked on internal mechanisms inside a heavy section. It has been found that enlargements up to at least three diameters are entirely practical.

Because of its absorption characteristics, betatron radiation has what is known as "absolute sensitivity" —that is, the size of the minimum detectable flaw with a given film setup does not depend on the total thickness of the specimen being X rayed. High contrast films will show flaws 1/32 in. deep (in the direction of the X-ray beam) and 2 mils wide through any thickness of steel as yet tested (12 in.) for such minute flaws. The position of the defect inside the specimen has no effect. Because of the low rate of absorption, high contrast films such as (1) industrial type M (Eastman or equivalent), (2) industrial type A (Eastman or equivalent), and (3) no-screen (Eastman or equivalent), are recommended. The films are listed in order of increasing speed and graininess. Where the specimen has extreme variations in thickness and where detection of 1/16 in. flaws is adequate, lower contrast films can be used, such as industrial type F (Eastman or equivalent). With all these films a lead screen 40 mils thick should be placed directly in front of the film, in contact with it. In no case is it necessary to block around the edge of an irregular object. Placement of lead behind the film casette is not needed for thicknesses of less than 12 in. No shielding is necessary to prevent backscattered radia-

for Industrial Radiography

Following several years of successful operation in wartime X-ray inspection of Army ordnance parts, 20-million v X-ray equipment is now being made available to industry for production inspection. Features of this unit, the betatron, which permit production of high quality radiographs rapidly and with low cost are described herein. These features are said to make this unit competitive, from an overall viewpoint, with 1 and 2-million v machines.

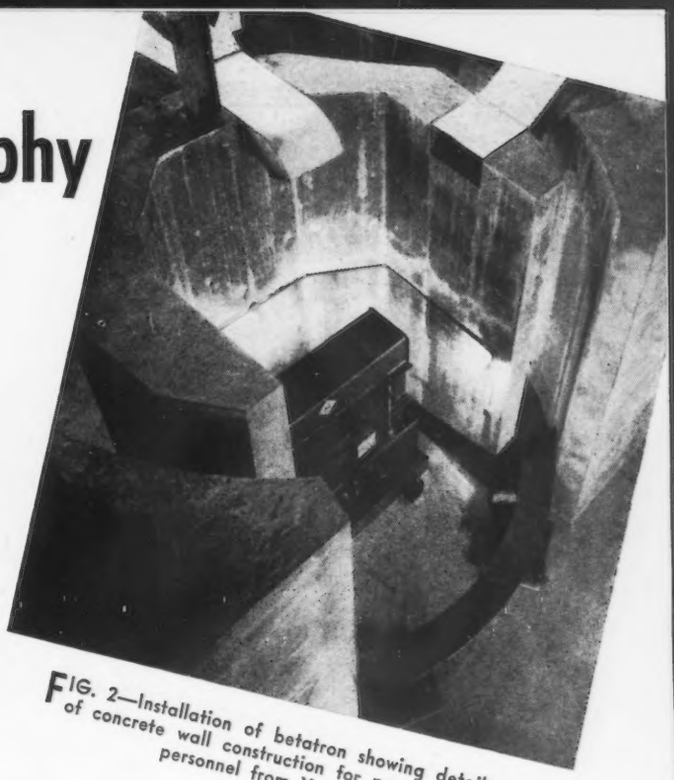

FIG. 2—Installation of betatron showing details of concrete wall construction for protection of personnel from X rays.

tion since X rays of this intensity produce secondary radiation in the same direction as the primary rays, except for very thick sections. While a greater density for a given time exposure can be gained by placing 10 or 20 mils of lead immediately behind the film; detail is noticeably poorer and is not recommended. Comparative exposure times for various sources of X Radiation are given in fig. 3.

Since there is little radiation from the sides and back of the betatron, only a few feet of protection are required for the operator in an adjacent area. In direct line with the beam, 4 to 6 ft concrete may be required, depending on the distance of the wall from the betatron.

The betatron will not be a low price device, although it will be competitive with existing 1 or 2-million v X-ray equipment.[1] Its primary advantage is, of course, the speed with which radiographs can be made. The cost for power is low (30 kva during exposure). It is proposed that 100 pct X-ray inspection[2] may be economically practicable, rather than the present practice of X raying only one of every 50 or 100 parts in production.

[1] *Operation of a 2 million volt X-ray unit was described in the article "Two-Million Volt Industrial Radiography," THE IRON AGE, June 13, 1946, p. 52.*

[2] *Advantages of 100 pct X-ray inspection were discussed in the article "The Case for 100 Pct X-ray Inspection of Aircraft Castings," THE IRON AGE, Oct. 10, 1946, p. 56.*

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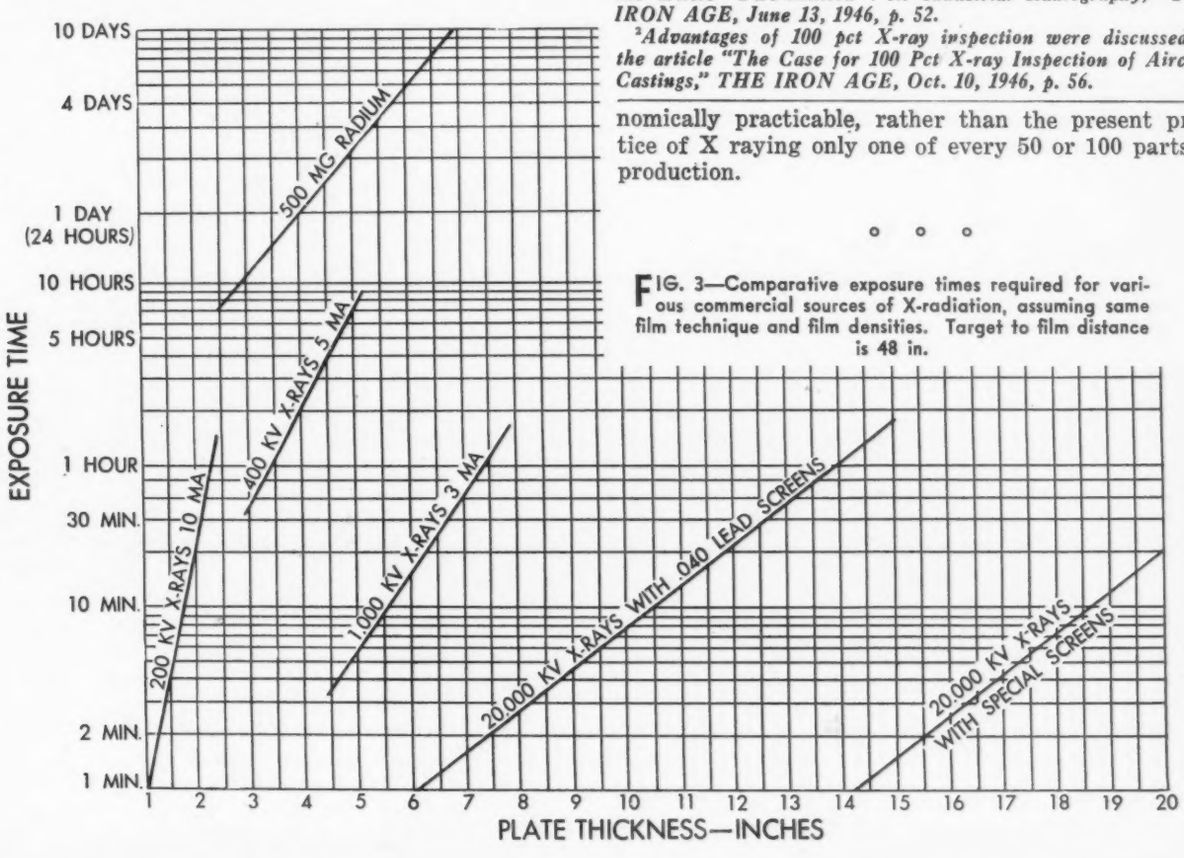
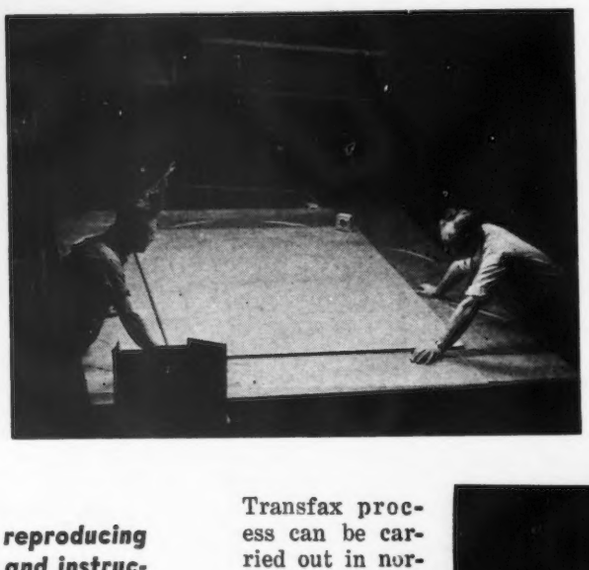

EXPOSURE TIME
10 DAYS
4 DAYS
1 DAY (24 HOURS)
10 HOURS
5 HOURS
1 HOUR
30 MIN.
10 MIN.
2 MIN.
1 MIN.
500 MG RADIUM
400 KV X-RAYS 5 MA
200 KV X-RAYS 10 MA
1,000 KV X-RAYS 3 MA
20,000 KV X-RAYS WITH .040 LEAD SCREENS
20,000 KV X-RAYS WITH SPECIAL SCREENS
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
PLATE THICKNESS—INCHES

FIG. 3—Comparative exposure times required for various commercial sources of X-radiation, assuming same film technique and film densities. Target to film distance is 48 in.

Reproducing Drawings On Metal

By S. H. BARMASEL

FIG. 1—The Transfax process begins with the application of a suitable primer to a clean metal sheet. Over the primer is sprayed Transfax, a quick-drying white coating, as seen here.



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LEFT

FIG. 2—As soon as the Transfax has dried it is ready for use. The drawing, prepared with black ink on translucent or transparent material, has been placed in tight contact with the metal, and is being exposed to arc, mercury vapor or photoflood light.

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A quick and simple method of reproducing engineering drawings, diagrams and instruction plates on nonporous surfaces is described herein. This process, which does not employ a silver emulsion, has the added advantage of eliminating darkroom techniques. The basic procedure of this process and several recent developments are herein outlined and a number of interesting illustrations of its application are given.

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IN recent years the application of photographic methods of reproducing drawings and diagrams on metal has found increasing acceptance. The use of phototemplates to eliminate hand scribing in the aircraft industry is already well known. Less familiar, perhaps, is the use of such processes in the manufacture of dials, wiring diagrams and instruction plates.

Although not, in strict terms, a photographic process since it does not employ a silver emulsion, the Kodak Transfax process offers a simple, low-cost reproduction method based on the fundamental principle of applying a light-sensitive coating to the metal surface. The draftsman's drawing is then printed on this coating by exposure to light—much in the same manner as a snapshot is made from a photographic negative. However, unlike photographic processes, the Transfax process can be carried out in normal room lighting. It does not require darkroom handling.

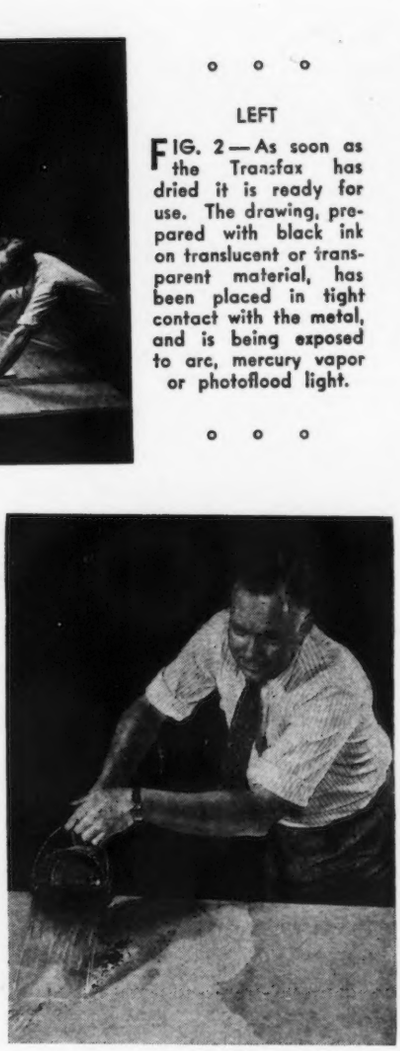

FIG. 3—After exposure the plate is rinsed with Transfax Clearing Solution or a 2 pct NH_3 solution to loosen the exposed parts of the Transfax.

The Transfax process requires five basic steps beginning with the application of a suitable primer to a clean metal sheet. Over the primer is sprayed Transfax, a quick-drying white coating ready for use as soon as it has dried (fig. 1). The coated metal is placed in contact with the drawing, prepared with black ink on translucent or transparent material, and is exposed to either arc, mercury vapor or photoflood light (fig. 2). After exposure the plate is rinsed with Transfax clearing solution (fig. 3) or a 2 pct NH_3 solution to loosen the exposed parts of the Transfax. These are washed away with warm tap water leaving the lines of the original drawing printed in white on

the metal (fig. 4). A transparent lacquer coating, which may be baked on or air-dried, protects the drawing from abrasion (fig. 5). The process, exclusive of baking time, takes about 8 min.

The basic problem of any such method as this is to insure the adherence of the light-sensitive coating to the metal surface. Experience has shown that Transfax is best suited to nonporous materials, being particularly well adapted to certain sheet steels such as boiler plate, to anodized aluminum, tool steel, Galvaneal and terneplate. With brass or bronze adherence is poor unless the surface has had a previous oxide coating.

Outside the metals field, Transfax can be applied to rubber, plywood, certain types of pressed woods and to a number of plastics. With plastics such as cellulose acetate, Vinylite, Lucite, Plexiglass and some Bakelites no primer coating is needed.

In general, Transfax can be used on any nonporous surface to which the primer adheres well. Used on such surfaces, it will withstand shearing, bending and punching with no tendency to loosen. It resists the application of a cutting torch (fig. 6), until it is carried away by the melting of the supporting metal.

By comparison with hand scribing which is a laborious task requiring checking, the Transfax method offers substantial savings in time. Not only are the diagram and working instructions transferred to the metal in a few minutes, but the process insures 100 pct accuracy. The introduction of error is eliminated. Particularly is this true where it is necessary to produce both a right and left hand layout on metal from a single drawing. Where the drawing has been made on a transparent original, it can be printed on the Transfax as laid out and then turned over and reprinted, producing a mirror or left-handed image.

The savings effected by Transfax in this work rise in proportion to the complexity of the original drawing. A study of manual and photographic methods of laying out working patterns on rough sheet metal revealed that the Transfax method resulted in a 30 to 40 pct saving in time with a resultant decrease in layout cost of 25 to 35 pct. Since the cost of materials is a constant and since no greater work is involved in reproducing a highly complex drawing than a simple one, it is apparent that these savings will vary with the complexity of the layout.

The accuracy of the method is dependent upon two factors: the dimensional stability of the drawing surface and the contact between the drawing and the sensitized surface. The process itself is capable of clearly rendering 130 lines to the inch provided perfect contact is made. It is not always easy under shop conditions to attain perfect contact, however, and to do so a vacuum frame is desirable. Where tolerances are extremely critical, it is necessary that the drawing be made on dimensionally stable materials.

Where Transfax is employed to make dials, instruction plates, name plates or wiring diagrams, it lends itself to a wide variety of color combinations through the use of colored lacquer undercoatings. The Transfax itself is white and where printed from engineering drawings, a white line is left on the surface since the Transfax lying beneath the lines of the original drawing is unexposed and remains fixed on the metal when the exposed portions of the coatings are washed away by water. Thus, for example, first applying a coat of red lacquer to a surface, the desired diagram would appear as a white line on a red background.

This process can also be reversed by making a photographic negative of the original on high contrast film. In such a negative the lines would appear clear while the background is dark. When printing from this on a sheet coated red and then coated with Transfax, the effect of red lines against a white background is attained. The Transfax is only washed away where

ABOVE

FIG. 4—Warm tap water is used to wash away the exposed parts of the Transfax, leaving the lines of the original drawing printed in white on the metal.

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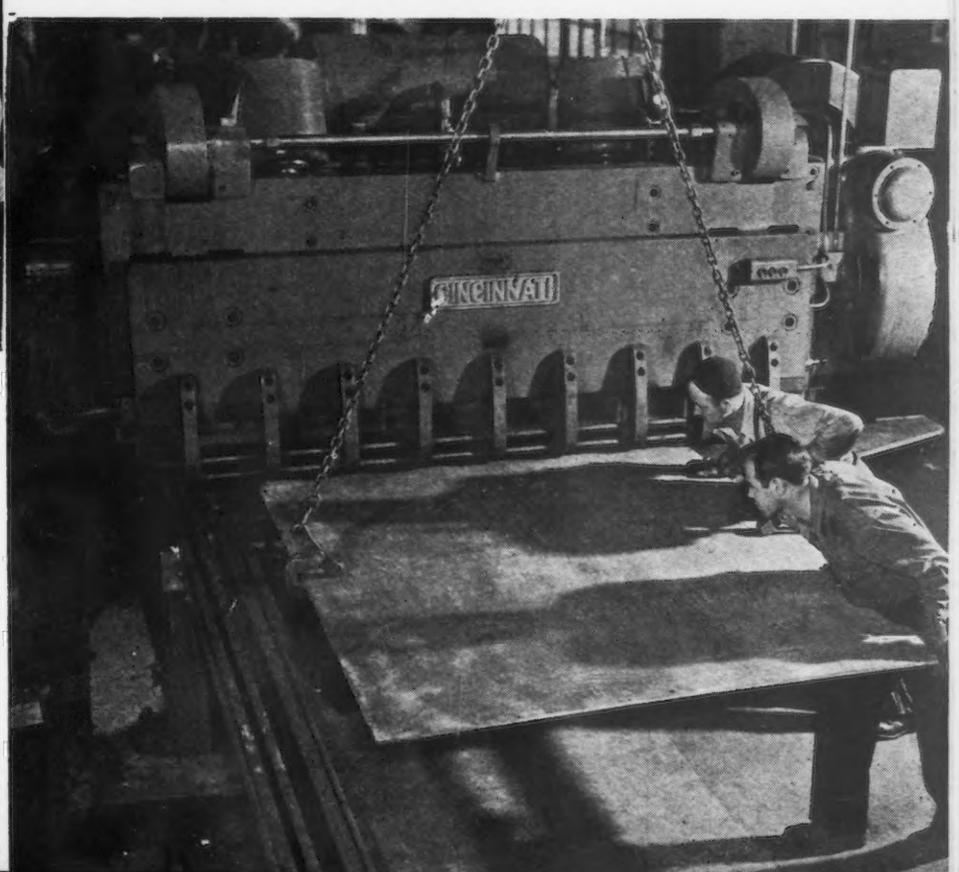
FIG. 5—After coating with a transparent lacquer overcoating, the metal can withstand rough handling without danger of abrasion to the layout. Here a large Monel metal sheet is cut in accordance with the engineering information appearing on it.



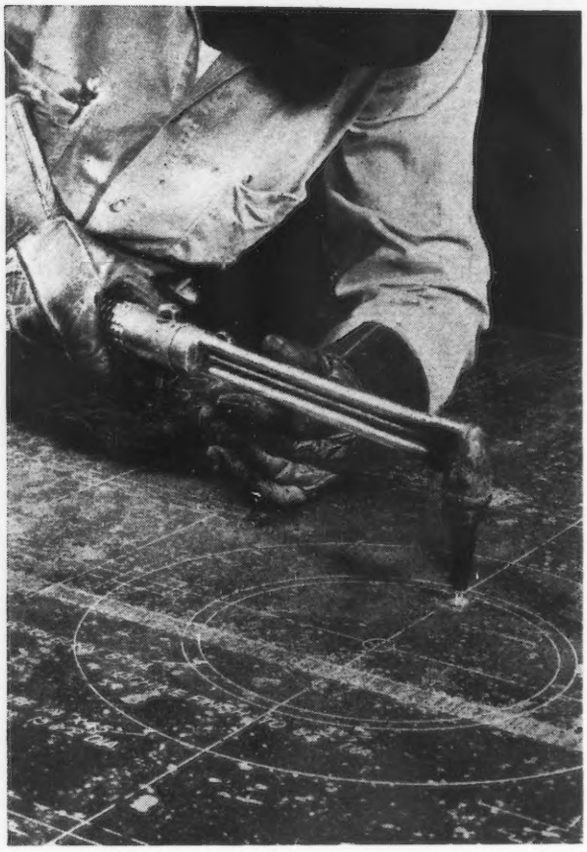


FIG. 6—Where a flame cutter is used with a Transfax diagram, the Transfax lines resist the effect of the cutting torch until the supporting metal has been melted away.

exposed through the clear lines of the negative.

In the manufacture of wiring diagrams, the following method has been adopted. The metal sheet is coated with black lacquer and printed from a negative of the diagram, complete with lettering and instructions. The finished plate appears as a black diagram on the white Transfax background. Diagrams such as these for electric equipment have proved resistant to fading and abrasion.

Still another advantage may also result from printing from a photographic negative, since it is possible to reduce or expand the original diagram when it is copied on film. In preparing dials by the Transfax process, for example, the original drawing is generally made two to three times larger than the finished size of the dial. This drawing is then reduced photographically, thereby minimizing any minor errors that might result from the varying thickness of the lines on the dial face. The actual metal dial faces then may be printed from the reduced negative.

In addition to the applications already mentioned, Transfax is used for stress analysis studies, providing an easy method of reproducing a series of lines on metal by printing a linear coordinate graph on the Transfax-coated surface. After physical testing of the part, these lines are examined with a microscope which includes a reticule having accurately spaced parallel lines. By aligning the reticule pattern with the lines on the tested sample, the engineer can quickly determine visually the amount and direction of the stress during forming operations.

Refractory Economy v. Combustion

TWO methods available to furnace engineers to meet changes in combustion practice which affect adversely refractory life are alteration of furnace design and the use of higher quality refractories, it was pointed out in a paper entitled "Relation of Refractory Economy to Combustion in Steel Mill Furnaces," by E. N. Hower, Homestead Works, Carnegie-Illinois Steel Corp., presented at the recent Cleveland meeting of the Association of Iron and Steel Engineers. Mr. Hower illustrated this point with a discussion of the trend from a negative furnace atmosphere practice to zero, or, more generally, a positive pressure in the work chamber of most furnaces. A positive pressure in a furnace increases the mean temperature of the furnace wall proper by the hot gases escaping through the cracks and crevices. On the other hand, the mean temperature of the wall is decreased by the cooling effect of outside air drawn in through openings when the furnace pressure is negative. Discussing a batch type billet heating furnace, the author said that the result of such a change, from negative to positive pressure raised the temperature of the arch brick above their softening point under load and subsidence accompanied by vitrification and spalling occurred. The failure of the door arch resulted in roof failure, although there was no failure of the roof brick. This condition was overcome by a change in furnace design and excellent results have been obtained by installing a suspended roof.

The author reviewed a number of such experiences, pointing up the need for a continuing survey and study of the effect of changing practices and improved materials. Results of a six year study covering some batch type slab heating furnaces served to dramatize the possibilities for cost control inherent in such surveys and illustrated that there exists an inter-relationship of a good many factors in addition to fuel and refractory costs.

Discussing the six-year study, Mr. Hower said that at the beginning of the period, and for several years prior to that, furnace life was about two years. During the next 2½-yr life steadily declined to a low of about 11 months and then, as the use of higher quality refractories began to take effect, furnace life rose gradually to about 18 months at the end of the 6-yr period: after that time it continued to increase and three or four years later, without major changes in design but continued improvement in the application of refractories, reached its former level of approximately two years. The cost, however, remained up, due to the use of more costly materials.

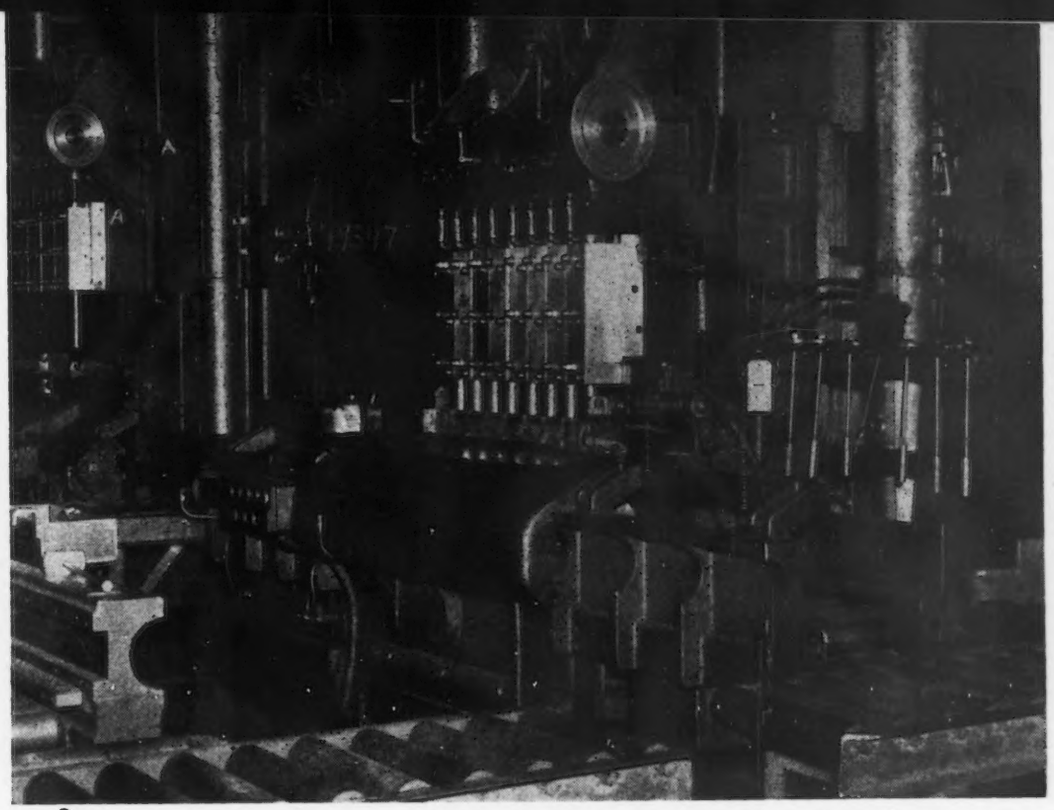


FIG. 1—After rough and semifinish boring, cylinder blocks are conveyed to these Ex-Cell-O machines for the finish boring operation.

Buick Modernizes Cylinder Bore Production

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By H. E. LINSLEY
Machine Tool Editor

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Improved ring seating, and substantially increased resistance to wear is being obtained in Buick automobile cylinders as a result of the new manufacturing techniques described herein. Precision boring and honing, air gaging, and selective piston fitting are combined with a chemical treatment to produce desired results.

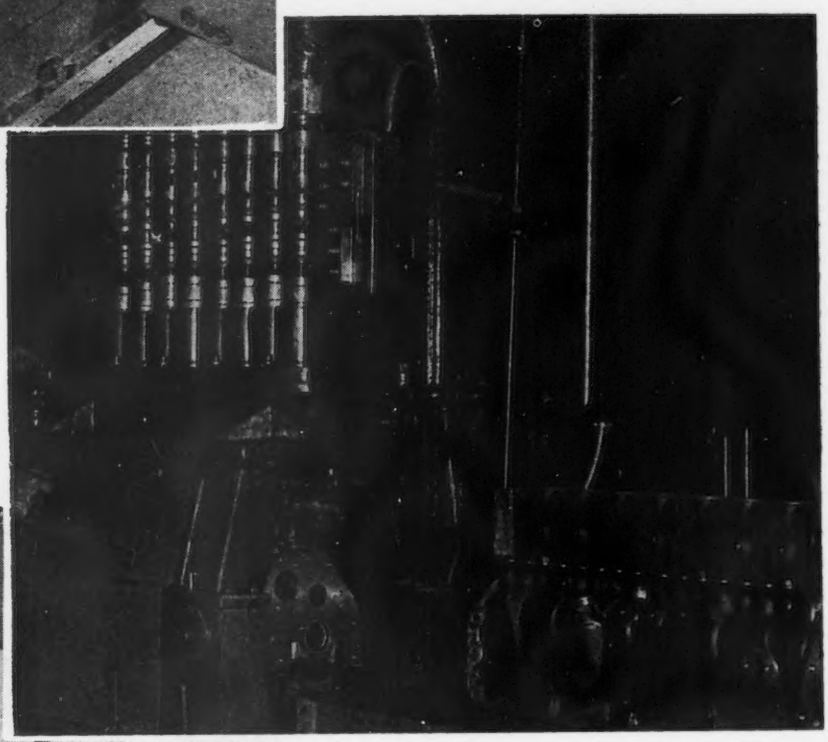
RADICAL revision of practices followed in Buick's engine building plant have resulted in more rapid seating of piston rings in new cylinders, truer bores in which better fits are attained, faster and better gaging and more rapid selection of pistons of correct size. Much of this improvement is a result of superior machining and gaging practice, but a part comes about through a special chemical treatment given the bores.

Experience has shown that unless cylinder bores are perfectly true when machined initially, they will not become more true through a honing operation or in service. Moreover, if a hone is used, as a sizing tool, the human element enters the picture to an important degree. In Buick's 1946 processing, this condition is largely eliminated since the bores are first brought to accurate size and shape on a precision boring mill. After the boring operation a hone fitted with relatively coarse, free cutting stone is used as a surface finishing tool, so that after the cylinder blocks have been through the honing operation the bores are accurate, and their surfaces are in condition to receive a chemical coating.

Machining of cylinder bores starts in Ingersoll eight-spindle machines in which ⅛ in. of metal is removed from the cored holes by carbide tools making the complete cut in 55 sec. This is followed by a so-called semi-finish boring or straightening operation whereby an additional 0.039 in. of cast iron is removed in 55 sec, again using carbide tools.

Above

FIG. 2—Checking the setup of the single point, carbide, finish boring tools by means of a special tool-setting gage and dial indicator.

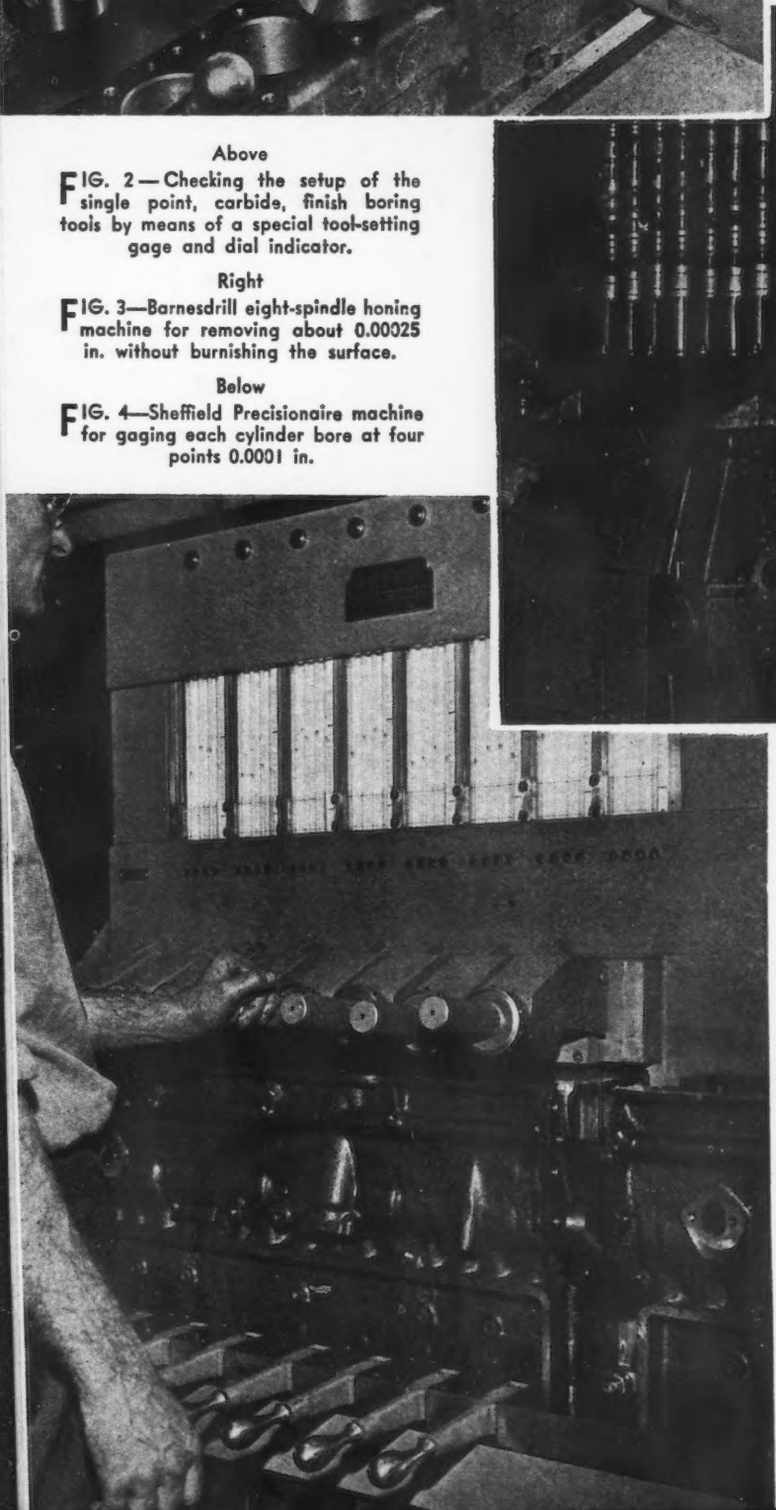


Right

FIG. 3—Barnesdrill eight-spindle honing machine for removing about 0.00025 in. without burnishing the surface.

Below

FIG. 4—Sheffield Precisionaire machine for gaging each cylinder bore at four points 0.0001 in.



Finish boring is done in new weight-spindle Ex-Cell-O machines that remove 0.010 to 0.012 in. on a side with single-point carbide bits. The point on these bits is honed to a radius of 0.015 in. and the tool actually cuts a thread of 0.006-in. lead and 0.0004-in. depth. On this cut, the diameter is held within 0.0007-in. limits of nominal size and out-of-round and choke (taper) within ±0.0002 in.

The final machining operation consists of honing in a Barnesdrill eight-spindle honing machine fitted with Micromatic hones with stones of grade 150K or 150J that remove not over 0.00025 in. of metal on the crests of the thread. These hones are chosen to remove the fuzz without burnishing or glazing the surface. In fact, the hones are allowed to make only a few strokes and, although the surface feels smooth to the touch, reflected light reveals the criss-cross pattern from the honing operation superimposed on the fine threadlike pattern from the boring operation.

Following this operation, the cylinder block is visually inspected and then is rolled into a Sheffield Precisionaire gaging machine which is among the most remarkable of cylinder gaging machines ever developed. This machine, built to Buick specifications, has eight gaging heads, each of which includes four pairs of air nozzles spaced, when elevated to gaging position, so that one pair is at the top of ring travel, one near the bottom and two at intermediate points 2½ and 5 in. down, respectively, from the top position. Nozzles of each pair are set into plugs at opposite diameters and never contact the cylinder walls, but can be rotated about the cylinder axes so that any out-of-round condition is easily determined.

Each of the two machines in use has an air compressor with a receiver and controls for

holding a constant pressure. Air for each pair of nozzles passes through a gage glass and escapes through the space left between the ends of the nozzles and the cylinder wall. The rate of flow depends upon this space, and the speed of flow causes a bob of light synthetic material to float in a gage glass at a height proportional to the flow. There is one glass for each pair of nozzles, or 32 glasses in all. Scales beside the glasses have divisions about ¼ in. apart and each division corresponds to 0.0003 in. in gage reading. It is thus easy to read within the nearest tenth, but the operator has only to observe that all four bobs for each cylinder come within lines marked on transparent slides, indicating total tolerance allowed, and to read the bob nearest the right hand scale in each set of four.

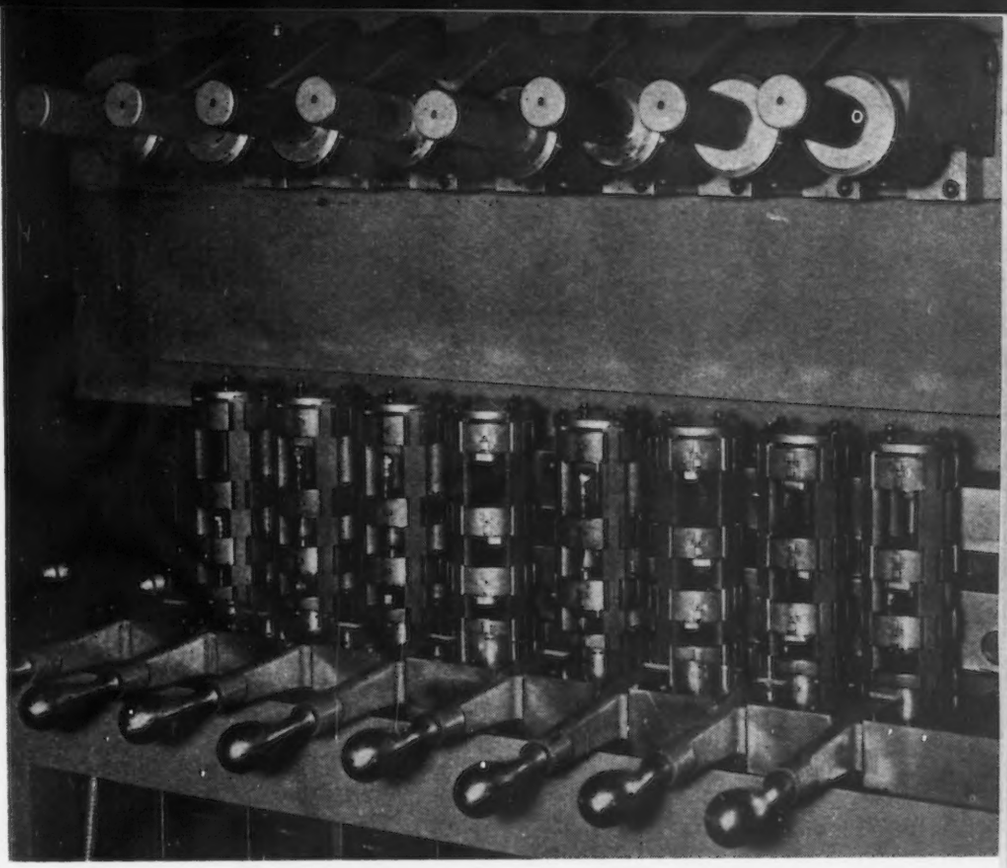
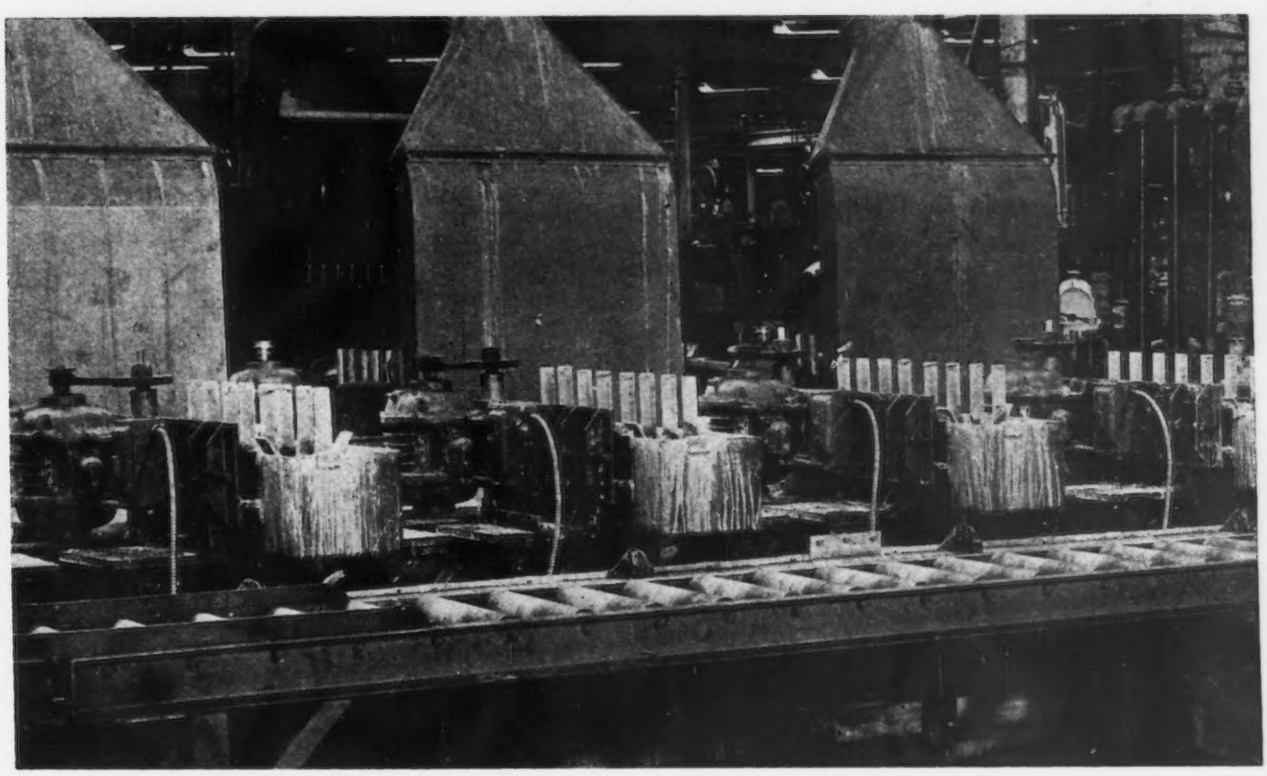


FIG. 5—Closeup of the gaging units and size-stamping levers of the gaging machine. Levers in foreground are used for shifting nozzle positions to check out-of-round conditions. Upper levers are used for stamping bore size on each cylinder.

This bob indicates the cylinder size that the inspector must stamp next to the corresponding bore. Having read the size, the inspector turns a lever handle to a corresponding number on a dial, raises the handle and drops it. This stamps the number beside the bore as an index to the size of piston required. Later, pistons, sized in corresponding steps, are fitted to each bore selectively. Bores must be held within 0.0007 in. of nominal size and usually come within 0.0006 in. or ±0.0003 in. Gaging commonly takes only

FIG. 6—Conveyorized Lubriting setup. Each small tank with standpipes carries a cylinder block and circulates liquid through the bores. Conveyor surrounds main liquid tank, and blocks are loaded and unloaded from roller conveyor in foreground.



30 sec., with an experienced inspector, and is many times faster as well as more precise than with plug gages. In fact, except for reading the bobs and stamping the numbers, gaging is almost completely automatic.

Cylinder bores are gaged in inverted position. The blocks are shifted into the machine automatically from a roller conveyor, are automatically indexed into position and locked, and the gaging heads then are raised automatically to the correct height and air is turned on before reading starts. After one block is gaged, a button is pressed, the gaging heads are automatically withdrawn and the block is released. Then the next block pushes it out. While the new block is being moved into gaging position and locked, the inspector records on a counting device the number of bores of each size on the block just gaged. This record permits the piston department to supply pistons of each given size in corresponding quantities, keeping production balanced.

From gaging, blocks are rolled into a Vulcan washer where they pass through sprays of a special cleaner which is so piped as to clean not only the bores but other holes in the casting. At exit from the washer, blocks are shifted from the roller conveyor onto a special loop conveyor in which the bores are given the Parco-Lubrite treatment using a hot manganese phosphate solution.

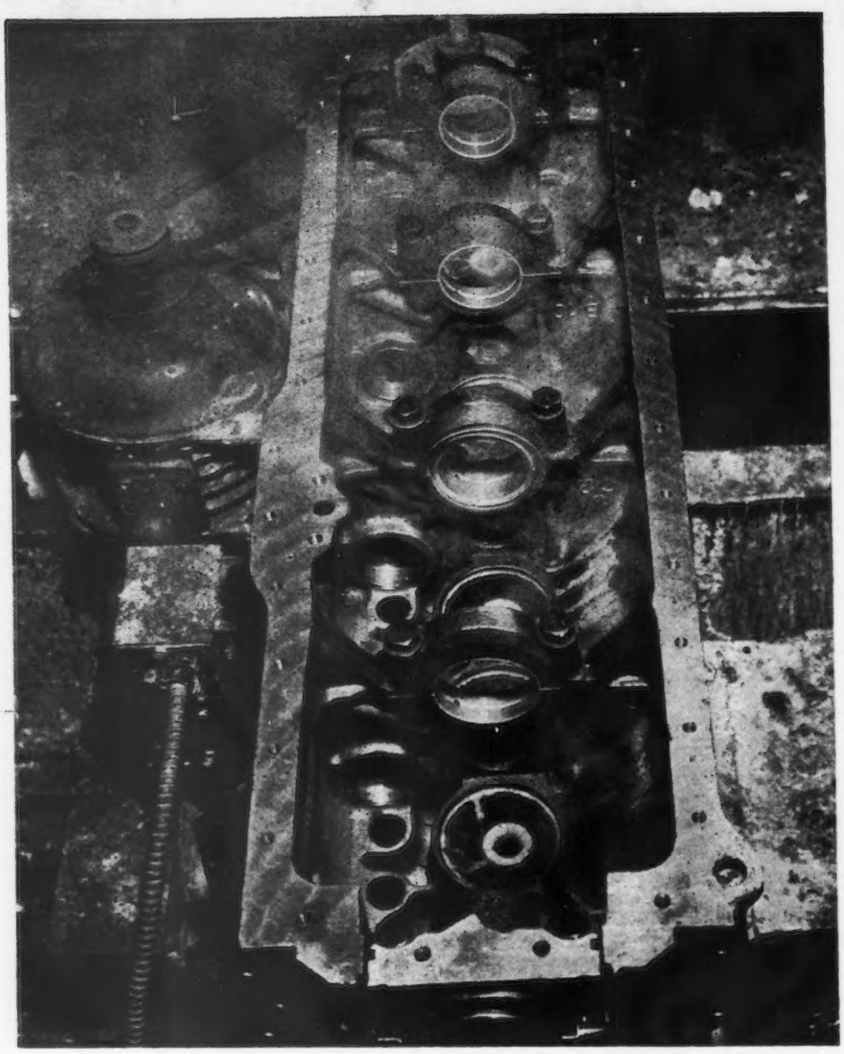


FIG. 7—Cylinder block undergoing Lubrite treatment. Hot solution rises in each bore and overflows down standpipe into main tank as individual tanks travel around its edge.

To do this, each block is set on a gasket inside a small tank equipped with eight standpipes, one of which comes axially through each bore. There are 20 of these tanks on the loop conveyor which passes around the periphery of a large tank through which the hot solution is circulated. Each small tank is equipped with a motor driven pump which sucks solution from the large tank and delivers it at the rate of 8 or 9 gpm through a manifold into each cylinder bore. Rising in the bore, the liquid overflows into the standpipes and drains back into the large tank.

This solution deposits the Lubrite coating by reaction with the cast iron surface of the bore. The reaction time is approximately 14 min. Makeup solution is added to the main tank as needed, to maintain the required concentration. At the end of the cycle, blocks are removed from the conveyor and are processed through the next machine, a Barnesdrill honing machine.

There, the bores undergo a very light lapping or honing operation, but the hone, instead of having stones, carries cast-iron sticks that merely smooth the Lubrited surface. The hones are given only four strokes and remove only the excess and high spots of the coating. This leaves a surface that insures rapid seating of the piston rings. Tests show that as a result of this processing ring scuffing is minimized and an excellent fit is maintained over a very long period.

▼ ▼ ▼

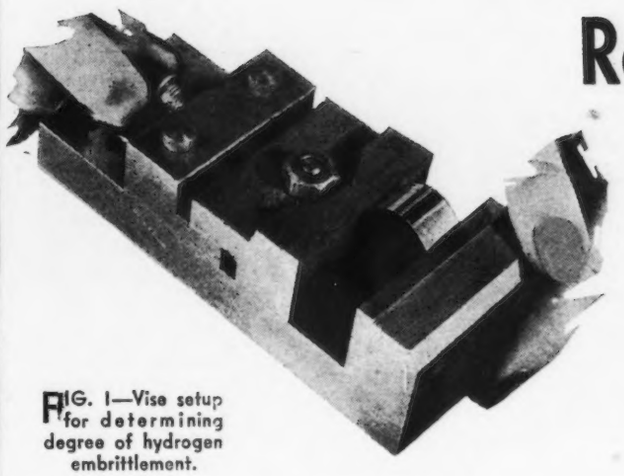


FIG. 1—Vise setup for determining degree of hydrogen embrittlement.

Reducing Embrittlement In Electroplating

By C. T. EAKIN and H. W. LOWNIE, JR.
Metallurgical Engineers, Material Engineering Dept. Westinghouse Electric Corp., East Pittsburgh, Pa.

The embrittlement of steel springs by hydrogen released from the electrolyte during plating is a phenomenon that causes failure at far below service stresses. The authors outline procedures, substantiated by several years production application, whereby such embrittlement can be minimized during the plating operation and removed by heat treatment following plating. A nonacid method for deplating is also presented herein.

A COMMERCIAL heat treatment of 2½ hr at 527°F has been found to be effective in the relief of hydrogen embrittlement in various types of electroplated steel springs. Six years of successful application in large scale production has verified this practice in general use. The experiments outlined in this article discuss this method of relief as well as relief in other cases, minimizing embrittlement during plating and avoiding embrittlement during removal of plate.

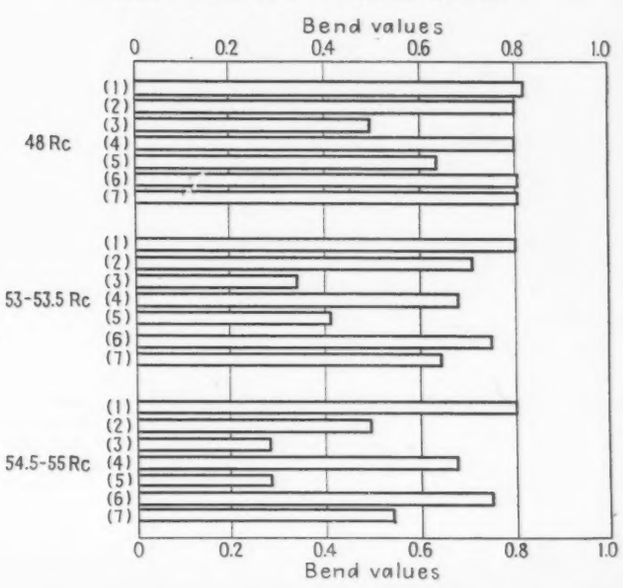
The spring material used in this investigation consisted of five reels of clock spring, 0.008 x ¼ in. each of different hardness, as listed in table I. Sections 1 in. in length were electroplated under laboratory control using cadmium in most cases, although zinc, copper and a double coating consisting of tin over cadmium were used in some of the experiments. The relief treatments were carried out in ovens equipped with automatic temperature control and time-temperature recording instruments.

In determining the degrees of embrittlement the springs were placed in a toolmaker's vise as shown in fig. 1. The jaw travel of the vise in hundredths of an inch required to break the spring as compared with the distance required to break an identical specimen not plated was taken as a measure of the degree of embrittlement. In operation this bend test was found to be quite sensitive and to yield reproducible results.

Hydrogen gas is evolved at the cathode (part being plated) during the electroplating of most metals. The visible evolution of this hydrogen is referred to as gassing. The cathode current efficiency of the plating bath is a measure of the relative amounts of electrical energy that go into deposition of metal as compared to the amount of energy that goes into the formation of hydrogen gas. High cathode current efficiencies (as for silver, plated from cyanide baths) indicate the occurrence of little or no gassing, while low current efficiencies (as for chromium, from acid baths) indicate considerable gassing.

Within a given type of plating bath the amount of gassing is a variable depending upon a number of factors subject to control. Therefore, tests were made to determine the degree of embrittlement caused by plating with practically no gassing and plating with severe gassing. Then tests were carried out on spring speci-

FIG. 2—Effect of gassing during plating upon degree of embrittlement; (1) as received, (2) immediately after plating, no gassing, (3) immediately after plating with profuse gassing, (4) 24 hr after plating, no gassing, (5) 25 hr after plating, profuse gasssing, (6) treated at 392°F for 4 hr, no gassing, (7) treated at 392°F for 4 hr, profuse gassing.



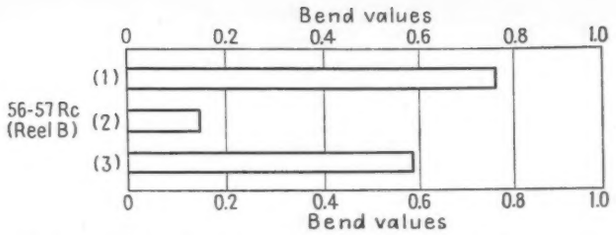


FIG. 3—Effect of bath agitation upon degree of hydrogen embrittlement; (1) as received, (2) plated without agitation of bath, (3) plated with agitation of bath.

mens of three different hardnesses using a cadmium cyanide plating bath. The relief treatment was carried out at 392°F for 4 hr. The results are shown graphically in fig. 2.

The graphs show that:

(1) Severe gassing was accompanied by increased embrittlement.

(2) Specimens plated with severe gassing did not recover as thoroughly as those plated with little gassing. This is true both for recovery at room temperature after 24 hr and at 392°F for 4 hr.

(3) Embrittlement was more marked on the harder materials.

It is the hydrogen absorbed by the steel which causes the embrittlement and not that which bubbles off through the electrolyte. This suggests that the degree of embrittlement might be lessened by promoting the prompt removal of the hydrogen by agitation of the electrolyte.

To investigate this possibility, test samples from the hardest of the five sample reels of spring material were cadmium plated with severe gassing both with and without agitation. The test data thus obtained, arranged graphically in fig. 3, show that the degree of embrittlement is materially reduced by agitation of the electrolyte during the plating operation. It is well to remember however that effective agitation may not always be practical in commercial operations.

A marked effect of hardness of the spring material upon the degree of embrittlement was observed in the results of the above tests. In order to obtain a more definite evaluation of this relationship, test samples, ranging in hardness from 40 to 57 Rc, were cadmium plated under normal plating conditions. They were tested for embrittlement (1) immediately after the plating operations, (2) 24 hr after, and (3) after having been treated at 392°F for 4 hr. The results are plotted in fig. 4.

The graphs confirm that:

(1) Springs of high hardness are more susceptible to hydrogen embrittlement during electroplating than softer steels.

(2) Springs of high hardness are not completely relieved by treatment at 392°F for 4 hr.

TABLE I

Spring Steel Used for Bend Tests*

Reel	Rc (converted from 10 kg Vickers)
A	47-48
B	56-57
C	50-51
D	52-53
E	40-41

* Nominal compositions (all reels); 0.90-1.05 C, 0.25-0.50 Mn, 0.04 max P, 0.04 max S.

(3) Electroplated springs in the hardness range 51 to 57 Rc are extremely brittle before relief treatment has been applied.

The seriousness of the condition referred to in (3) above, is illustrated by the fact that springs in this condition have been known to fracture when being poured from one tote pan into another. Slender springs may be fractured when in this condition by air blast, which is sometimes used to accelerate drying after plating.

Examination of figs. 2 and 4 shows that complete relief of embrittlement of the cadmium plated springs was not obtained in all cases by application of the 392°F treatment for 4 hr.

Embrittlement Relief Treatment

In order to investigate the possibility of improving the efficiency of the embrittlement relief treatment, a time-temperature series was run to determine the best time and temperature for complete relief.

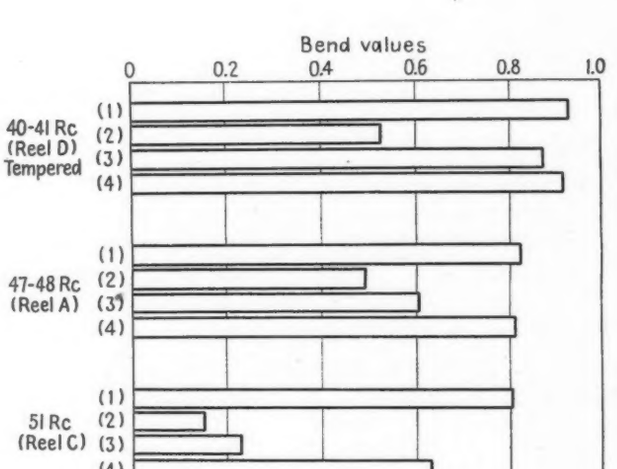


FIG. 4—Effect of hardness of steel upon degree of embrittlement; (1) as received, (2) as plated, (3) 24 hr after plating, (4) treated at 392°F for 4 hr after plating.

Springs of high and of low hardness, 57 and 40 Rc, were used in this investigation. The complete test was made only on the harder material as it was desired to obtain the most severe conditions likely to be encountered in practice, the previous data and experience having shown that the harder material is more difficult to relieve.

The samples were cadmium plated in the bath at high current density to give severe gassing. Plating time was 5 min. Within ½ hr after plating, the samples were treated in an electric muffle furnace for various times and temperatures.

After completion of the relief treatment, each sample was submitted to the bend test. The data obtained are plotted for the hard and soft material, respectively, in figs. 5 and 6.

These graphs show that:

(1) Springs of low hardness (40 to 41 Rc) are relieved of hydrogen embrittlement with comparative ease.

(2) Springs of high hardness (56 to 57 Rc) require uneconomically long times for relief of hydrogen embrittlement at 437°F but are completely relieved in 1 hr at 527°F.

Although complete embrittlement relief was obtained, even in the hard material, by treating for 1 hr at 527°F this treatment provides practically no margin for safety. In order to allow for variables in production operations, including a somewhat longer time for springs of thicker section, the time for relief at 527°F may well be extended to 2 or 3 hr to insure complete relief. Temperatures above 527°F damage the cadmium plate. Therefore, when it is desired to standardize on one treatment for springs of all hardnesses, the 527°F treatment is applicable with good results to the hardness range from 40 to 57 Rc.

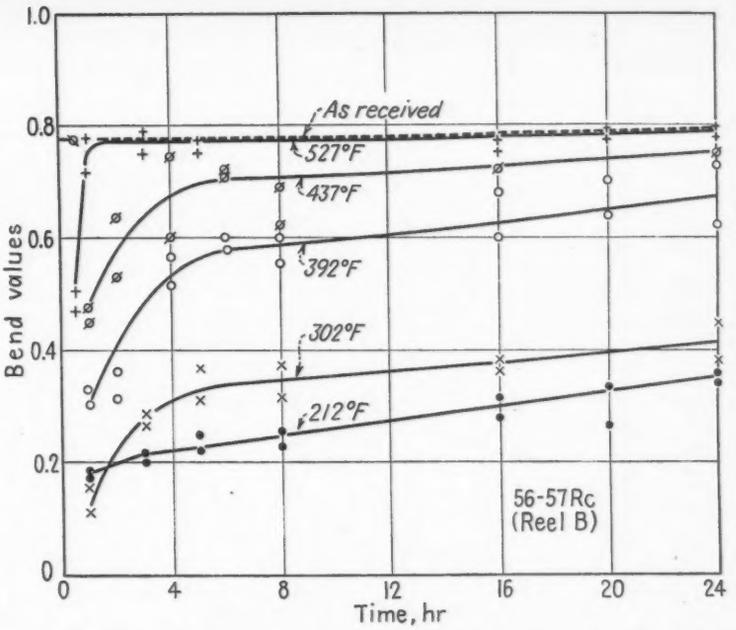


FIG. 5—Effect of heat treatment on removal of hydrogen embrittlement from cadmium-plated steel springs of high hardness.

At first thought it may appear that the use of softer springs would provide a suitable remedy for embrittlement. Closer consideration, however, reveals that this is not a satisfactory solution. The amount of energy that can be stored in a steel spring of a given size is proportional to the elastic limit, which is in turn dependent upon the hardness. It follows that to resort to lower hardness the load capacity of the spring would be reduced accordingly. In addition, thermal treatment for the relief of hydrogen embrittlement cannot safely be eliminated even when springs of low hardness are used.

The high elastic properties necessary for steel springs are imparted to the steel by thermal treatment such as quenching and tempering or by cold working thermal treatment in conjunction with cold working as in the case of music wire. In the former method, the tempering temperature normally is considerably higher than 527°F. Springs made from music wire are usually heated for stress equalization at approximately 527°F. Treatment of electroplated steel springs at this temperature should, therefore, not be expected to impair the properties of these materials. In order to provide concrete evidence of this, quenched and tempered strip and music wire were tested both before and after treatment at 527°F. The data in table II show that quenched and tempered steel springs of approximately 56 Rc hardness retain their original hardness after going through the operations of plating, relieving for 3½ hr at 527°F and deplating. The data in table III show that the tensile properties of music wire are not impaired by this treatment.

In all cases where cadmium-plated springs are relieved at 527°F, the appearance of the plate was acceptable and as good as for springs relieved at low temperatures.

Other Types of Electroplate

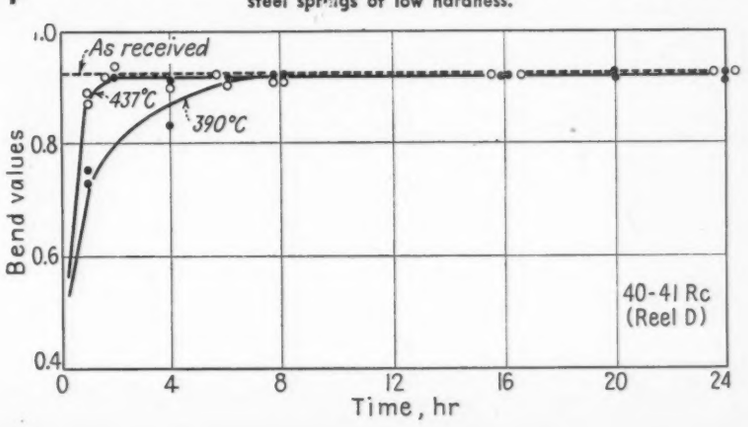
Copper-plated steel springs are often required to meet a minimum electrical conductivity requirement. To satisfy this requirement a certain minimum cross-section of copper must be maintained. Treatment at 527°F results in an appreciable loss of copper cross-section because of surface oxidation. Therefore, in some cases it may be necessary to conduct the hydrogen embrittlement relief treatment below this temperature. Fig. 7 is a graphic representation of the bend test data obtained on copper-plated steel springs of two hardnesses relieved at various times and temperatures.

It is too costly to remove the hydrogen from copper-plated springs at a temperature much below 300°F because of the long time required. For steel of 47 Rc, complete relief was obtained in 16 hr at 300°F. For harder material of the order of 57 Rc, complete relief required some time in excess of 48 hr at this temperature. This length of time is commercially uneconomical. However, at 57 Rc, treatment for 10 hr at 392°F gave complete relief.

There is some tendency for zinc plate to blister if placed in an oven at 527°F. This can be remedied effectively by heating more slowly and using a slightly lower temperature for a somewhat longer time.

In the case of a finish consisting of a tin electroplate

FIG. 6—Effect of embrittlement relief heat treatment upon cadmium-plated steel springs of low hardness.



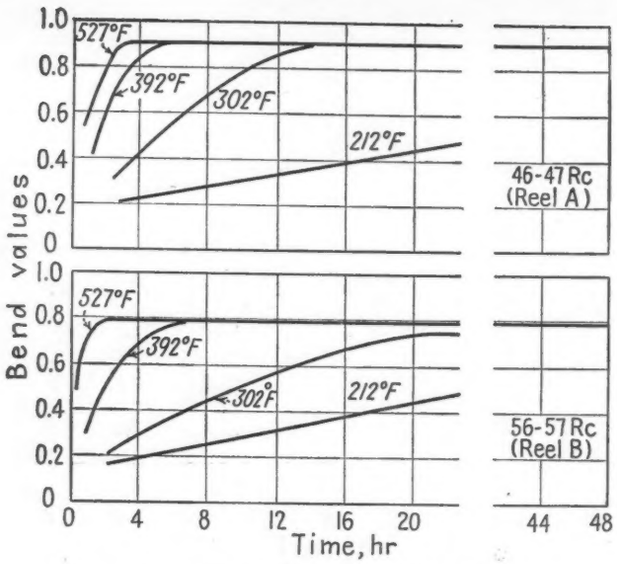


FIG. 7—Effect of embrittlement relief heat treatment upon copper-plated springs of high and medium hardness.

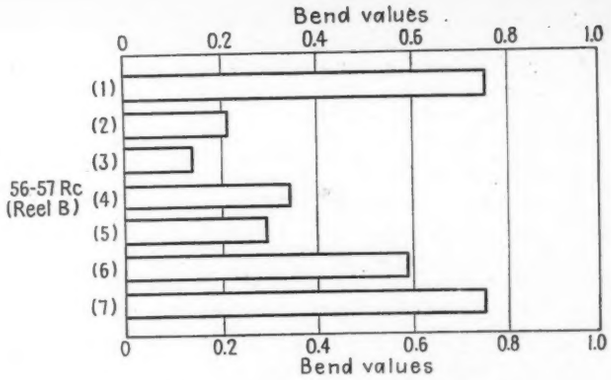


FIG. 8—Effect of deplating with acid and with ammonium nitrate upon hydrogen embrittlement of cadmium-plated steel springs; (1) as received, (2) as cadmium-plated, (3) deplated in HCl, (4) heated in air at 212°F for 5 min after plating, (5) deplated with ammonium nitrate, 30 pct solution, for 10 min at 68°F, (6) same as (5) except held in deplating solution 5 min at 194°F, (7) same as (6) except held in deplating solution for 10 min.

over a cadmium electroplate, the outer plate, tin, will melt if subjected to temperatures in excess of 450°F, the melting point of pure tin. Cadmium and tin form alloys which in the high tin content range melt at a temperature below that of pure tin. For example, the eutectic composition containing 33 pct Sn melts at 354°F.

When treated at 392°F for 10 hr, springs with this finish were completely relieved in hardness up to 57 Rc. Although this temperature is above the melting point of the tin-cadmium eutectic, there was no apparent fusion of the plate, as springs in contact during the treatment did not stick together.

Hydrogen relief treatment carried out at 300°F on tin-cadmium electroplate paralleled the results obtained with the copper plate in that the time required for relief at this temperature was again in excess of 48 hr for steel of the order of 57 Rc and 16 hr for 47 Rc.

A second condition was investigated in which the springs were cadmium plated and relieved for 3 hr at 527°F. The relieved springs were then tin plated. Embrittlement again occurred, although to a lesser degree than that which existed before the cadmium-plated springs were relieved. The use of this intermediate relief treatment will not eliminate the necessity for a final relief treatment, nor will it appreciably reduce the time or temperature necessary for the final relief.

Embrittlement in Plate Removal

In commercial operations, it is sometimes necessary to remove electroplated coating from steel springs. Complete removal of the plate can be obtained with dilute acids but this procedure gives rise to severe hydrogen embrittlement of the steel, as shown in fig. 8. It is doubtful that the most efficient relief treatment will remove such severe embrittlement. There is also the possibility that while the last traces of the plate are being removed the acid will attack the steel at other locations. Therefore, acid should never be used for deplating of steel springs.

Electroplate can, however, be removed by other methods. Cadmium plate for example can be safely and completely removed by immersion in a solution of ammonium nitrate without inducing hydrogen embrittlement and, in fact, if a hot solution is used, part of the embrittlement due to plating is removed. Cold solutions react quite slowly. For example, the electroplate on the specimens, the data for which is shown graphically in fig. 8, was removed in 45 sec by a 30 pct solution at 194°F but required 4 min at 68°F.

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TABLE II

Effect of Heat Treatment on Hardness of Reel B

Hardness as received:					
Vickers (10 kg)	642	642	613	613	613
Rockwell C (by conversion)	57.8	57.8	55.6	55.6	55.6
Hardness after relief for 3½ hr at 527 °F:					
Vickers (10 kg)	613	627	613	642	613
Rockwell C (by conversion)	55.6	57.0	55.6	57.8	55.6

TABLE III

Effect of Heat Treatment on Tensile Properties of Music Wire

Reel 1—Half of coil as received
Reel 2—Half of same coil after 3½ hr at 527°F.

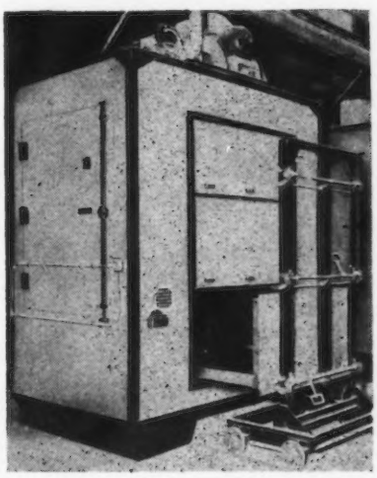
	Elastic Limit, Psi	Ultimate Strength, Psi
0.02 in. diam:		
Reel 1	369,000	435,000
Reel 2	360,000	437,000
0.04 in. diam:		
Reel 1	351,000	380,000
Reel 2	351,000	367,000

New Equipment . . .

Heat Treating

Developments in various types of heat treating furnaces, including electric and gas-fired ovens, and carburizing, descaling and forging furnaces are described in this week's digest. Induction heating generators, small electric heat treating furnaces, infra-red preheaters, and gas combustion units are also described.

A PULL-DRAWER oven has been developed by *Genrich Oven Div., W. S. Rockwell Co.*, Fairfield, Conn., which offers the advantages of drawer type ovens for processing batches of work per drawer, yet eliminates all superstructure for



handling the drawers. They are supported on a puller mechanism set on a simple channel iron base frame riding on ball bearing wheels in a track guide on the plant floor. The puller engages any one or all the drawers and is easily pulled or pushed by one man. Fans, heaters and motors may be set directly on the oven roof. Drawers have a subway grating over their shelf area, suitably reinforced to carry the load. They ride on rollers at the rear and are supported at the front by the grab hooks which engage the cleats on the front panel of each drawer. The oven itself is of insulated dual panel, featuring "no through-metal construction" throughout, and is reinforced in a steel framework. Heat is supplied, in the three-drawer oven illustrated, by electric heaters nested at one side and baffled from the heating chamber. Where gas, oil or steam heating is desired, an air heater may be installed on the oven roof, or gas or oil burners may be fired into a combustion chamber at one side of the oven. Heat is drawn from the heater through a recirculating fan on the roof, discharging into a slotted supply duct at the other side wall and blowing horizontally across the work, returning through the heater in a rapid, constantly recirculating motion.

Gas-Fired Oven

FASTER and better baking and increased capacity are advantages claimed for a gas-fired coil and armature oven developed by the *Despatch Oven Co.*, 619 S. E. Eighth St., Minneapolis 14. Large diesel generators and diesel-electric motors up to three tons can be baked in 8 hr instead of 16. Two 3-ton motors or armatures can be baked at one time, or a single load of six 1-ton armatures. These loads are handled with a traveling crane and a rail-mounted oven dolly. Size of the oven is 6 ft wide x 10 ft long x 7 ft high. The oven is heated with a 500,000 Btu air heater externally mounted on top of the oven to con-

serve floor space. The forced exhaust system complies with underwriters' requirements and removes fumes quickly from the oven. Convection heat and automatic controls demand little attention from operators and insure uniform temperatures throughout the baking period at all points in the oven, it is said. The coil and armature oven is built to allow processing at temperatures up to 500°F.

Carburizing Furnaces

DEVELOPMENT of a line of electrically heated, cylindrical, gas carburizing furnaces with

maximum temperatures of 1800°F has been announced by the *Industrial Heating Div., General Electric Co.*, Schenectady 5. Featuring rapid and uniform distribution of carburizing gas throughout the charge through the use of a fan located on the furnace cover, the new furnaces are suitable for carburizing such parts as gears, splines, pins and bearing races. There are three furnaces in the new line, rated at 59.5, 77.5 and 110 kw. Loading baskets are 20 in. in diam x 24 in. deep, 20 x 36 in., and 25 x 36 in. The furnace cover is lifted hydraulically, and guides are provided which prevent it from being lowered unless it is in proper position for sealing with the retort in the furnace. A 1½-hp fan is used on all three sizes, with the fan motor mounted on the furnace cover. Tanked propane or natural gas is the carburizing medium used.

Air-Draw Furnaces

AN improved line of recirculating air-draw furnaces which is gas-fired, using an atmospheric burner with a comparatively rich primary mixture, with enough air as a secondary supply to complete combustion, has been announced by the *Eclipse Fuel Engineering Co.*, 778 S. Main St., Rockford, Ill. These burners are fully protected against electric and gas failures by

an electronic flame-failure unit, which is claimed to prevent filling the work chamber or recirculating system with unburned gases. Among the improvements is a panel control system completely assembled and pretested at the factory, and delivered for installation as a single unit. Bearing construction has been improved and design has been simplified for more efficient operation and easier servicing.

Forging Furnace

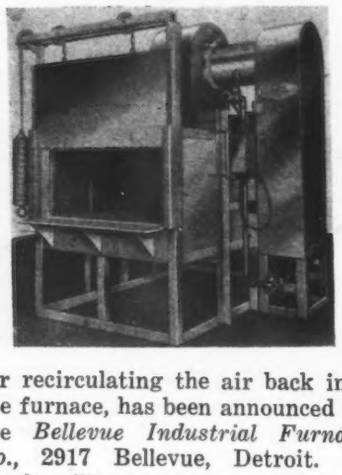
USING only one-half the floor space formerly required by three smaller furnaces, a controlled atmosphere forging furnace has been manufactured by *Despatch Oven Co.*, 619 S. E. Eighth St., Minneapolis 14, producing, it is said, 33 1/3 pct more than the total combined output of the three furnaces. The furnace utilizes a special four-in-row muffle arrangement to keep overall dimensions to a minimum: less than 12 ft wide and 6 ft deep. Each muffle is 12 in. in diam and has a working depth of 36 in. A system of back-towards-front firing gives smooth uniform heat through the entire working depth of muffles. This controlled atmosphere furnace uses nitrogen gas, processes hard steel forgings at 2250°F, and is said to handle over 2300 pieces per day. Air-operated doors allow fast removal of forgings from convenient-level hearths, which make direct-to-press handling possible. A single automatic-control system operates quick-response fuel valves to maintain heat accurately in all four muffles. Furnaces are available in all sizes, gas or oil fired.

Descaling Furnace

DEVELOPMENT of a system of heat treating which actually does the work of two departments in one by simultaneously preparing steel for machining, has been announced by the *Lithium Co.*, 111 Sylvan Ave., Newark 4, N. J. The system hinges on induction of a vapor form of the chemical element lithium into the furnace's heating chamber. Through atomic action, lithium not only prevents formation of scale during annealing, but renders the scaly crust formed in previous forging and heating of the metal harmless for subsequent machining operations. Work emerges tempered by the annealing and ready for the machine shop after the one operation. With the Lithium descaling furnace, the only expense is the cost of a small charge of lithium and the atmosphere gas. The furnace, nearly 90 ft long, incorporates new design features such as radiant tube heating and a double row conveyor system which moves two lines of work through the heating chamber simultaneously. Only two men are required to operate the descaling furnace; all moving parts are automatically operated.

Batch Type Furnace

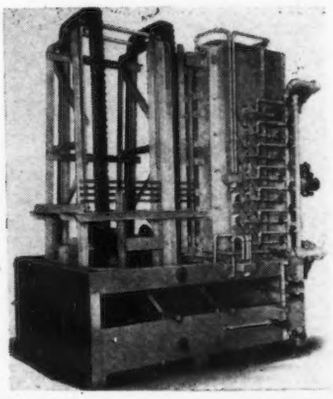
FOR the heat treating of aluminum alloys, a batch type furnace which consists of an atmospheric type burner mounted on the lower end of the duct which is used



for recirculating the air back into the furnace, has been announced by the *Bellevue Industrial Furnace Co.*, 2917 Bellevue, Detroit. A Garden City high temperature fan is standard equipment for recirculating the heated air. This method of heating holds temperature with little or no variation, it is said, and mounting the burner in the dust eliminates the necessity of an extra heating unit.

Bar-End Forge Furnace

ADAPTED to production-line techniques, a vertical bar-end forge furnace which heats the ends of approximately 500 bars per hr, has been announced by the *Selas*



Corp. of America, Philadelphia 34. Metallurgical results are uniform, it is said, due to a reproducible time-temperature cycle which is of such short duration that there is hardly time for scale to form. The furnace illustrated is designed for bars 65 in. long, flexibility is provided for handling diameters from ½ to 1½ in. The length of bar and temperature of heat can be closely controlled. Bars are placed in a conveyor on one side of the furnace and the ends pass through a short water-cooled heating zone fired by 28 Duradiant burners. After bar ends are heated to forging temperatures, the bars are discharged on the opposite side to the process operator.

Induction Heaters

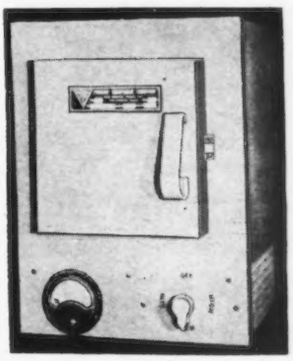
MODEL 1400 high frequency induction heating generator, illustrated, is manufactured by the *Induction Heating Corp.*, 389 Lafayette St., New York 3, and features flexibility of application, filament voltage stabilizer, variable output control and circuit-breaker overload protection. When fully loaded, this unit can deliver an output of 1400 Btu per min or approximately 25 kw at a nominal frequency of 375 kilocycles into a piece of work. It has a full-load input of 50 kva at 90 pct power factor and operates on a 205-245 v, 60

cycle, three-phase power supply. The tube complement consists of two water-cooled oscillators and six rectifiers, protected against damage by a time-delay water system. Power output of the generator can be adjusted from approximately 10 pct to full load by means of a dial. This Thermonic unit can be used for brazing, soldering and fusing as well as for hardening, annealing, tempering, etc. A single, dual purpose unit suitable for induction and dielectric heating operations has also been developed by the company. Especially designed for use in experimental laboratories, testing depots and development research departments, this heating generator is provided with two separate, interchangeable oscillator sections, one for induction and the other for dielectric heating. It operates on

205-245 v, 60 cycles, single-phase power supply, and has a full load input of 12 kva at 90 pct power factor. Its full load output is 285 Btu per min or approximately 5 kw at nominal frequencies of 375,000 cycles per sec for induction heating and 20 000,000 cycles per sec for dielectric heating operation. Tube complement of this unit comprises two mercury-vapor rectifiers and one water-cooled oscillator.

Electric Kiln

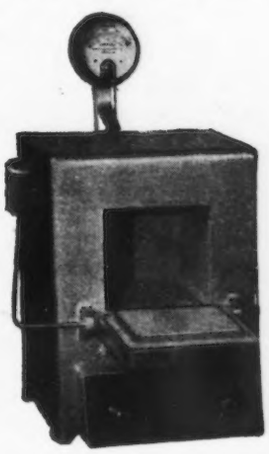
UTILIZING temperatures up to and including 1850°F, a versatile heat treating furnace has been made available by the *Pereny Equipment Co.*, 842 N. Pearl St., Columbus, Ohio, for small workshop and laboratory use. This furnace, known as Pereco Model 220-W, is applicable in plastics, heat treating of metals, porcelain enameling, laboratory control work, etc. Hardening, annealing, drawing, carburizing or melting metals; preheating high-speed steels, melting or annealing glass and ceramic firing are also claimed for its small



production work. The furnace is quality insulated; has a wall-thick hinged door and has resistance wire wound embedded elements for heating to its high temperature. It operates on 115 v and draws 1500 w.

Electric Furnace

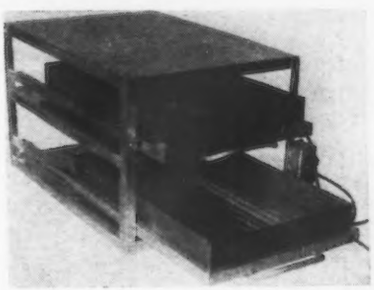
KNOWN as model CEA, an electric furnace which offers wide utility for general laboratory use and for production heat treating of small parts has been developed by the *Thermo Eectric Mfg. Co.*, 480 W. Locust St., Dubuque, Iowa. The heating chamber measures 4¾ in. wide, 4¼ in. high and 6 in. deep, with overall dimensions of 12 in. wide, 15½ in. high and 14½ in. deep. The furnace is said to maintain a temperature of 2000°F continuously and to automatically hold any selected temperature from 500° to 2000°F. The furnace can heat up to 1500°F in 30 min. Construction of the furnace features



one-piece aluminum castings for the body and door, combining strength with light weight. The counterbalanced door swings forward to provide a handy loading platform. Insulation is cast permanently in place inside the furnace body and special high temperature alloys are used for the heating element which completely surrounds the chamber to assure uniform heat distribution. Mounted on the control panel is the Temco variable heat control which provides any desired temperature by the turn of a knob and holds it automatically. The panel also contains an indicating pyrometer showing muffle temperature, and an on-off toggle switch. Model CEA is available for ac or dc currents, 115 or 230 v.

Infra-red Preheater

ANNOUNCEMENT of a preheater for infra-red heating where applications require thermo-switch-controlled low temperatures, with a minimum plus or minus variance up to 380°, has been made by the *Delt-Calesco Co.*, Far Hills, N. J. The unit is open on all sides

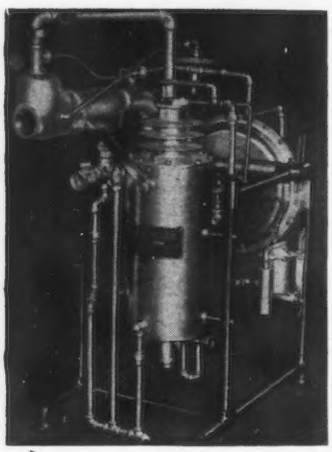


to allow released moisture to be dissipated and not confined to processing materials. Drawers are separately removable from two sides. An Infra-Lectric plate consisting of aluminum-carbon alloy elements fused into tempered glass forms the bed of the drawer, allowing all-over even plate temperatures. Materials may be placed above or below the plate or rest directly on the surface. The preheater is adaptable for preheating plastic preforms, dehydrating industrial materials and drying paints and metal finishes.

Gas Premixer

DEVELOPMENT of the Vapofier, which, utilizing fuel oil, generates and supplies a vapor, which is then mixed with air and is piped, burned and controlled in the same manner as utility gas, has been announced by the *Vapofier Corp.*, 10316 S. Throop St., Chicago 43. The operation is simple: fuel oil is maintained at a constant

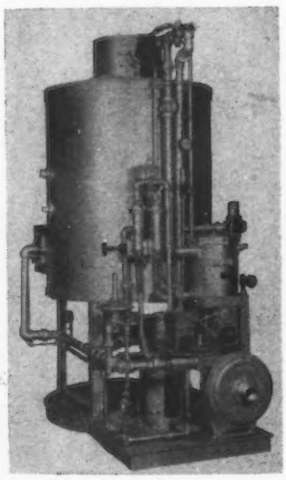
level in the combustion chamber by a simple float valve. The products of combustion are drawn through the surface of the oil in the combustion chamber, heating the oil to vaporizing temperature. The vapor thus created is drawn off through the premixer where proper fuel-air ratio is established and maintained. The combustible mixture is then piped to the burners. Fuel-air ratio may be predetermined and maintained throughout the entire range of capacity. Flame quality may be varied from oxidizing to reducing. The Vapofier is subject to the same automatic controlling instruments which are used with any gaseous fuel. When it is used as an oil-gas generator for heat processing, it is said to give faster penetration, less scale, complete high-low or floating heat control. Its applications range from baking ovens



operating at 150° to high temperature furnaces requiring over 3000°F. Eight standard sizes are built with capacities from 70,000 Btu's per hr or 0.5 gal per hr to 2,000,000 Btu's per hr, or 14 gal per hr.

Atmosphere Generator

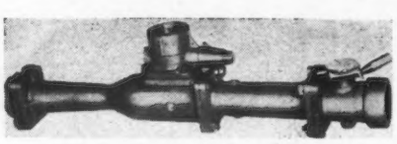
A DEVELOPMENT in endothermic atmosphere generators is the Hyen Hydryzing generator, a fully automatic central station unit that can furnish atmosphere for a number of furnaces. This new unit manufactured by the *Lindberg Engineering Co.*, 2444 W. Hubbard St., Chicago 12, produces a clean, dry gas for hardening, brazing and sintering all medium and high carbon steels without decarburization or carburization. Gas analysis is carbon dioxide, 0 pct; carbon monoxide, 21 pct; hydrogen, 40 pct; methane, 1 pct; nitrogen, 38 pct; oxygen, 0 pct; and dew point −20°F. Like an air compressor, or an electric generator, the Hyen is fully automatic. After lighting the



pilot, all phases of operation are controlled by means of push buttons. The generator requires no charcoal, and does not have to be burned out periodically to remove soot. A refractory retort permits the use of higher cracking temperatures than ever before possible, enabling the unit to produce a cleaner and drier gas. The Hyen operates by city gas, natural, propane or butane for both atmosphere and heating. It is built in four standard sizes, 500, 750, 1500 and 2500 cu ft per hr.

Gas Combustion Element

PRODUCTION of a constant-ratio mixer for low pressure air and gas, known as the **Flomixer,** has been announced by the Industrial Div. of *Bryant Heater Co.*, 17822 St. Clair Ave., Cleveland. This combustion unit, designed for use in industrial process equipment, utilizes the energy of a stream of air at pressures up to 3 lb to entrain a combustible gas and to deliver the mixture at unusually high



pressure to the burners it supplies. An air supply of 1 lb pressure is said to produce a mixture pressure of 13-in. water column with natural gas, 11½ in. with manufactured gas. Accurate gas-air proportions are maintained at all rates of flow, it is claimed, as long as zero pressure gas is supplied. The gas ratio adjuster is a universal type, suitable for any type of gas. Gas from 550 to 3200 Btu can be handled with no change of equipment necessary in case of change-over. The device is easily adjusted, and may be sealed at any setting. The Flomixer is available in pipe sizes from ¾ to 4 in., straight or 90° air sleeves.

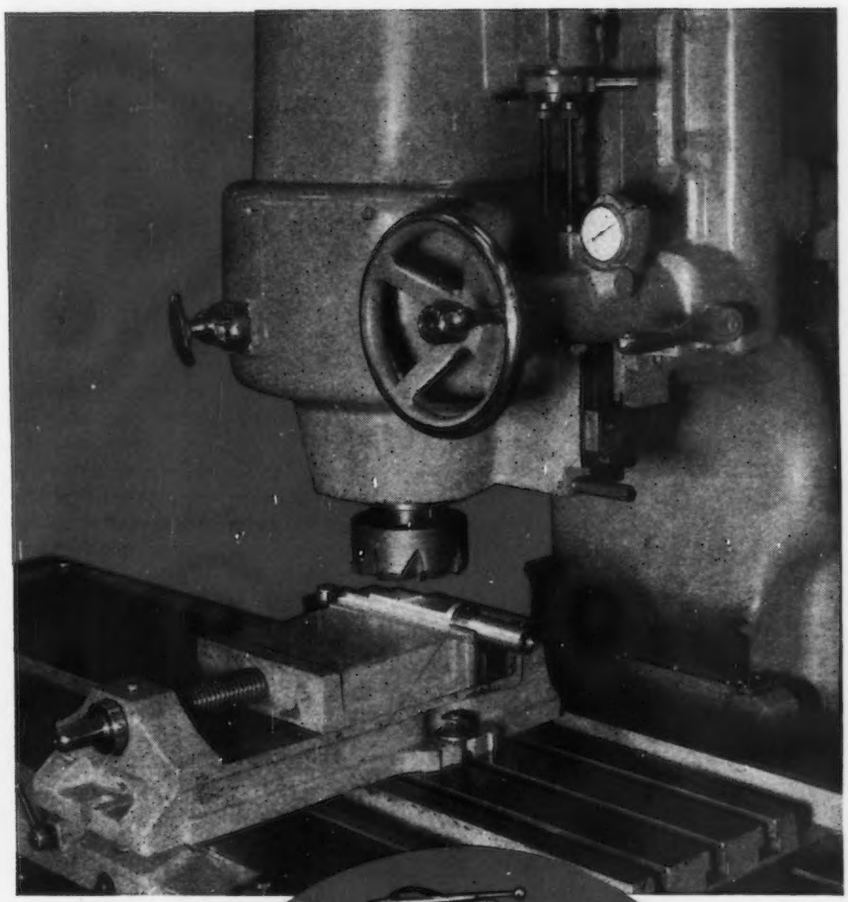
Power Generators

TWO models of induction-type electronic power generators, of 2 and 15 kw output, have been designed by the *Engineering Products Dept.* of *Radio Corp. of America*, Camden, N. J., for the precise, localized heat treating, brazing and soldering of metals. The two generators are used in processes which call for accurate control of temperature and localization of heat, where localized heat is necessary to prevent warping and distortion of the workpiece. Rapid

heating by this means can also be used to step up production. Both of the power generators are electron tube units designed for the conversion of electrical power from the commercial 60-cycle supply to a frequency of approximately 400,000 cycles per sec. The 2 kw and 15 kw generators, designated as the 2-BL and the 15-BL, are each composed of two units, the main generator unit and an applicator unit. The main generator unit houses the high-voltage rectifier, the main control and protective devices, and most of the high-frequency components. The applicator unit houses the output current transformer and its associated high-frequency elements.

STAINLESS STEEL MILLING

Made easy on a Kearney & Trecker CSM



THE JOB

Stainless steel is difficult to mill under almost any circumstances—but this super-powered CSM, equipped with the proper cutter literally "walked through" this job.

OPERATION:	Rough Mill Stud
MATERIAL:	Stainless Steel
CUTTER:	6" Dia.; 8 Tooth
TABLE FEED:	21 IPM
SURFACE SPEED:	346 SFM
DEPTH OF CUT:	.441" (Max.)
FEED PER TOOTH:	.020"
MILLING TIME:	26 Seconds

STAINLESS STEEL STUD

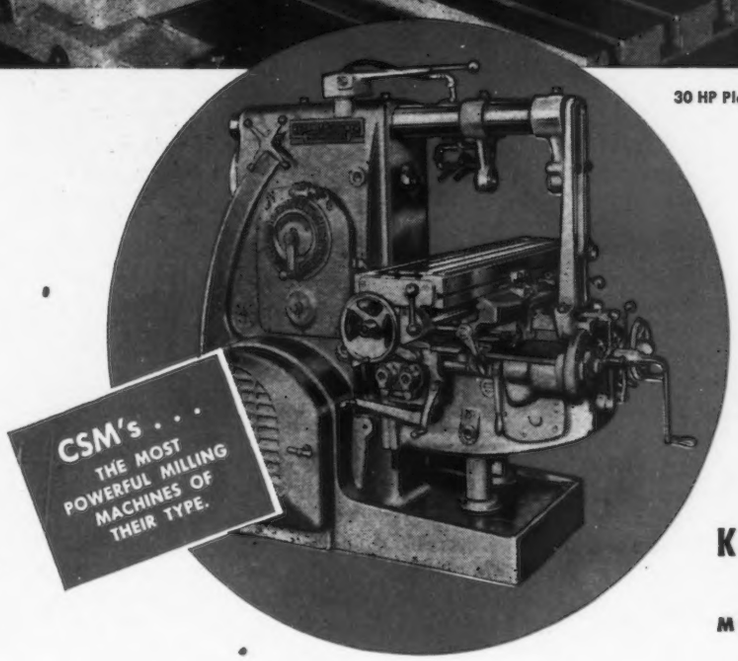
Note the excellent finish obtained despite the high rate of metal removal. The milling time of 26 seconds includes both surfaces. Micrometer stop dial indicator on machine facilitated this step milling operation.

• • •

CSM Milling Machines were designed to obtain the greatest benefits from modern cutting tools, and are now part of our line of standard models. The design has been developed after complete analysis of industry's problems of milling with carbide cutters.

Because they are knee type machines, they are readily adaptable to a great variety of work. They are precision built in accordance with long established Kearney & Trecker standards, and will cut metals faster and to finer tolerances and superior finishes than ever before, with high speed steel cutters as well as carbide cutters.

CSM machines are available in 20, 30 or 50 H.P. models in both plain and vertical knee types.



30 HP Plain CSM

Write for complete data on CSM machines—CATALOG CSM-20. Please indicate your business connection.

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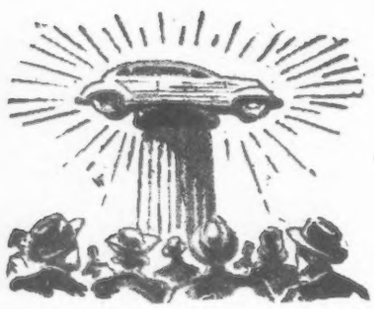
4715

BE READY FOR TOMORROW . . . WITH CSM's

Assembly Line . . .

WALTER G. PATTON

• Packard looks for an improvement in the steel supply situation . . . $20 million expansion program includes introduction of new truck line . . . Ford losses through September are set at $51,600,000.



DETROIT—It is refreshing to learn that at least one top automobile executive can see an improvement ahead in the steel supply situation.

At a press conference held here this week, George T. Christopher, president and general manager of Packard, revealed that during the past several months Packard has drawn on its inventory for 1200 tons of steel because Packard believes that the steel situation will definitely improve in the months ahead, but this hope was expressed before the coal strike loomed.

Packard's optimism is based on several factors that may be overlooked by those who are concentrating on the present critical situation with respect to steel. For one thing, Christopher said, the removal of price controls will result in an improved output of many low profit items by the mills. Sheet steel, he asserted, has been at a constant disadvantage pricewise under government controls and many of the items now critically short will come back into the market following an adjustment in flat-rolled steel prices.

In addition, Christopher believes that many of the pipe lines supplying the housing program are already filled to capacity and the demand for building materials will tend to soften during the winter months. While farm equipment producers have to complete implements already in process, he said, priorities have already been removed from these items and this, too, will tend to divert more steel to the automotive industry.

DURING the interview, Christopher disclosed that the average Packard "float" of steel is about 45 days and this is the bank which has been drawn on during the past few months. In computing factory float, Packard includes both raw steel on hand and steel in process. Since a rule of thumb often used by the auto industry suggests that for every 100 tons of steel in storage, 100 additional tons will be in process, the 45 day "float" described by Christopher would indicate that an average of 22 days' supply of unprocessed steel is currently on hand at Packard while a corresponding amount is on its way through the plant to the assembly lines.

It should be pointed out, however, that this does not mean that 22 days' supply of *each item* is available as inventory; it is indeed likely that many individual items are in much shorter supply than 22 days. At the same time, a 4 months' supply of some items is available according to the Packard executive.

"With no interference from labor strife," Christopher said, "the steel supply situation is certain to improve." On the basis of an improved supply situation, Packard plans to increase production 30 pct by Mar. 1.

The demand for Packard cars is holding up well, according to Christopher. While duplication of orders is known to exist, the amount of duplication today is less than it was a few months ago and, up to the present time, canceled orders for Packard cars have been more than made up by new orders received. Packard dealers are reasonably certain, he said, to have more orders on their books at the end of the year than they had in August.

The largest number of cancellations, Christopher said, result from the decision of the owner to spend several hundred dollars on an overhaul instead of buying a new car. Many have done this, he asserted, and the trend in this direction is expected to continue. At the same time, Packard owners have tended to retain their orders and not cancel them and this is a hopeful sign in the eyes of Packard management.

DESPITE present production delays and uncertainties with respect to the supplies of raw materials, Packard is investing $20 million in the future because it believes that while "the industry is suffering from 'skin irritation' the heart (of the automobile industry) is all right." This is the most ambitious program ever projected in Packard's history.

The above amount covers reconversion and plant expansion to date and the tools and dies and engineering for the company's next new automobile models and other diversified products. Of this total about $13 million has already been spent. Except for the new transmission, Packards' new tools are ready according to Christopher, but the specific date of introduction of new models has not been set.

The fact that Packard has already announced that its 1946 models will be continued "well into 1947" would indicate that the fall of 1947 is the earliest possible introduction date being considered at the present time.

At present, the company cannot see justification for the interruption to assembly lines and the loss of production that will be entailed in introducing new models, Christopher said.

Except for the fact that Packard has a new automatic transmission that "looks like it is ready to go," the Packard head declined to reveal any of the details of its new models. He did indicate, however, that revolutionary changes such as rear engine cars were not being considered. Packard has no plans for a light car and intends to stay

BETTER PLASTIC MOLDS

Faster

The versatile Keller at work on a plastic radio cabinet mold at Sterling Engineering Company, Winsted, Conn.

A plastic product cannot be better than its mold. Production and profit demand not only more accurate molds but speed and economy in their making. All three — economy, speed and accuracy — are supplied by "tracer-controlled milling" of the Pratt & Whitney Keller machine . . .

Many plastic molds require fine detail on side walls or in deep corners, along with minimum draft angles (sometimes only a half degree). By ordinary methods, such detail is difficult and expensive to produce. With the versatile, flexible Keller, there is no such difficulty. As the illustration shows, the fixture which carries the master and the work may be tilted or turned at an angle as needed. This does not change the relationship between master and work, or between tracer and cutter, but it does make the side walls and corners easy to reach. Result — mold designers are free from mechanical limitations in producing complicated cavities.

A Keller in your shop will turn out both volume and variety of molds. It guides itself automatically, speeds production — lowers cost. There are Keller machines in sizes and with capacities to meet any requirement. Write today for full information.

PRATT & WHITNEY

Division Niles-Bement-Pond Company

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in its present price class. No immediate price increase is contemplated.

At the present time, Packard is producing 6500 cars per month although the plant could turn out 13,000 cars each month, using two shifts of workers. There will be difficulties in going to a second shift, however, since the raw materials will definitely have to be in sight before the second shift is attempted and the task of going from a single to a two-shift operation presents formidable difficulties.

PACKARD, it was officially disclosed, has plans for the production of trucks up to 1½ tons and this would probably have been under way now if the materials had been available. A 1½ ton upper limit was set because this is the top capacity that can be handled by Packard dealers who will sell the new line.

As of Nov. 1, Packard was employing about 11,000 workers of which about 2 out of 3 had no automotive experience prior to VJ-Day.

Before Packard resumed production, all machines and gages were individually tested to make sure that quality would be maintained. While this is a costly procedure, Christopher said, it has paid off very well in production experience.

Packard inspection costs are much higher than prewar, it was disclosed.

At the moment, Packard productivity is about 75 pct of prewar output per worker. With an average daily rate of $1.38 per hr this brings the "real wage" cost up to $1.75 per hr at present, Christopher said. Productivity has leveled off in recent months and the present rate is not improving.

Packard's engineering budget is double the prewar peak. In addition, the company is spending $1 million for repairs and improvements at its 500-acre proving grounds and $750,000 has already been spent to realign its research center.

Speaking of the labor situation, Christopher said:

"There are a few heartening signs that some labor leaders now realize that production is the only cure for the industry's ailments. If labor withholds further wage demands and concentrates on increased production—not only in the automobile industry but in all business—the working man will soon discover that he has increased his buying power by decreasing prices through the law of supply and demand."

ANOTHER look inside the automobile industry was made possible as a result of a public address this week by Ernest R. Breech, director and executive vice-president of the Ford Motor Co.

During the first three quarters of 1946 Ford lost $51,600,000 despite two price increases granted the company, one in March and one in May. There was a third price increase in September, Breech said. but this has had little effect on these results. The loss of $51,600,000 was before tax rebates. Had this loss represented the full year's operating results, the tax carry-back would have reduced the loss to $32,900,000, it was said.

Ford has had to defer large expenditures for much needed manufacturing improvements, Breech revealed. The expenditure of $50 million the company would like to invest in added research and engineering facilities has been postponed. "And of course we are going to have to earn back these losses before we can do a great many things we would like to do—things like retirement plans and plans for stabilized employment."

Thus, it became evident what Ford's attitude will be if the subject of a guaranteed annual wage and pensions to workers is introduced in its labor neogtiations scheduled for next spring.

The key fact in labor relations today, Breech asserted, is that organized labor is not simply an economic thing—it is a social thing. "Men and women are often proud of their unions and take comfort in the vision of better things which they see in the programs and purposes of the union."

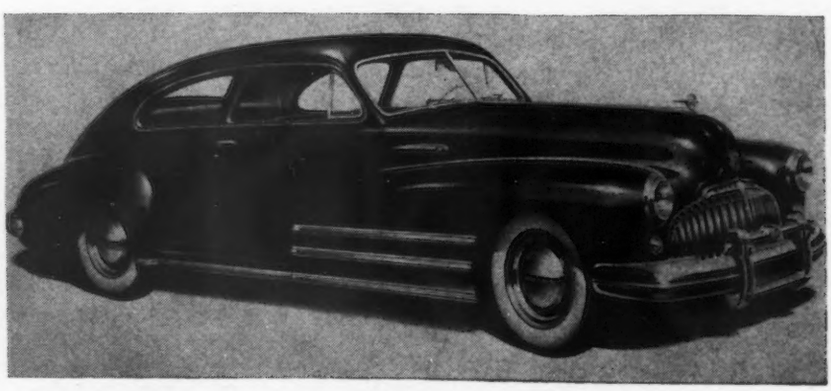
Breech proposed a 4-point program to meet the new conditions:

(1) Develop "leadership" in business by business heads. Get rid of brass hat-ism and learn to understand thoroughly the men who work under the business executive.

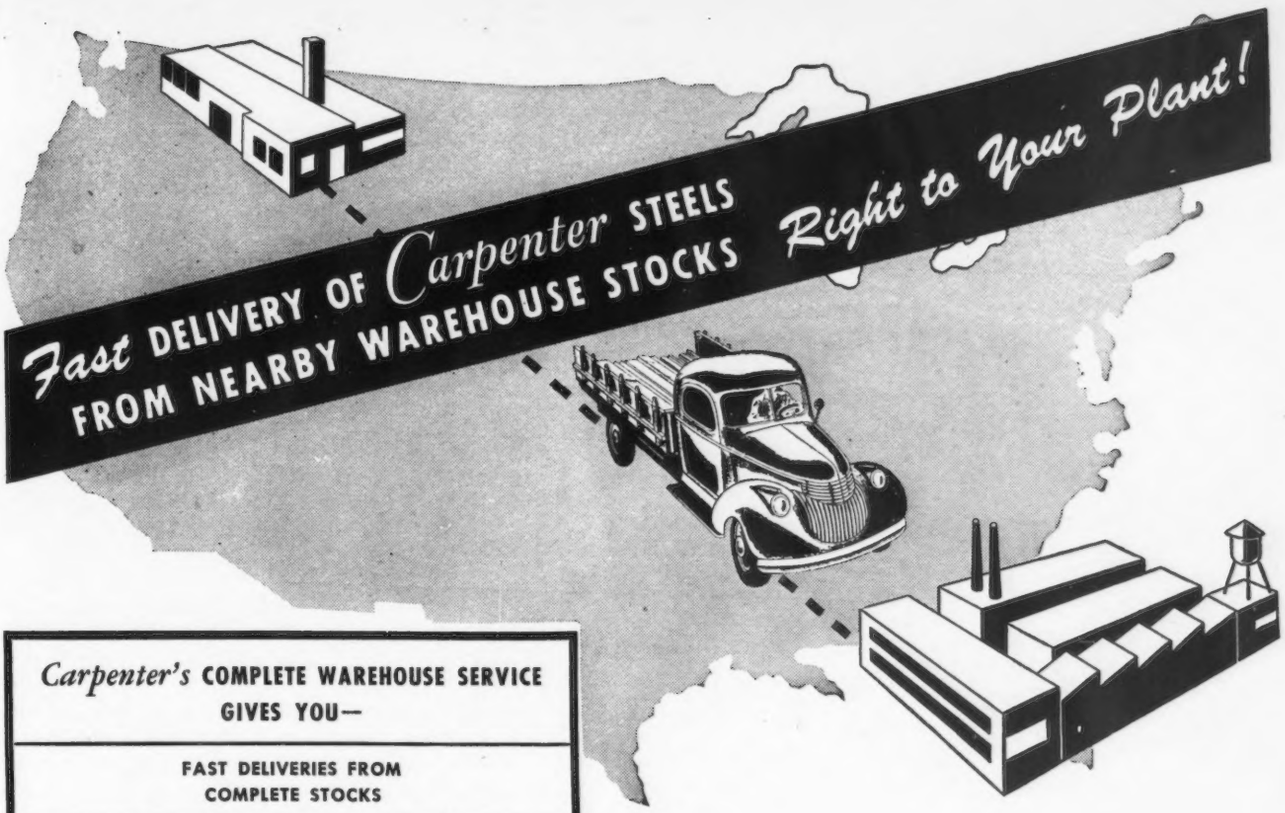
(2) Drop the word "management" from business thinking and substitute the dynamic word "leadership." Management, Breech said, is a "sit-down" word whereas leadership suggets enterprise, courage, vigor, a program and a purpose.

(3) Businessmen should spend more time working with people at all levels in government. Constructive work with government people, he said, should be undertaken not as opponents of proposals but as honest, experienced, well-informed citizens who want to make a contribution to the public welfare.

(4) Develop a mass production and mass distribution system which meets the new needs created by the phenomenal growth of the free enterprise system. "The men who can best do this job," he concluded, "are the men who helped to build our mass production economy in the first place."



NEW BUICK: *Production starts this month on the* 1946 *model series Buick* 40 *Special cars having* 121*-in. wheelbase. Shown above is a six-passenger* 2*-door Sedanet.*



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Washington . . .

L. W. MOFFETT

• Industry's price increase restraint on the whole pleases Washington . . . Steel's attitude commended . . . J. D. Small, CPA head, cautions both labor and management.

WASHINGTON—So far the Administration is, with perhaps some qualifications, pleased over what has happened since industry has been returned to a "free price economy." Under government control for more than 5 yr, there obviously was a jittery feeling that industry might let loose with high boosts on a wholesale basis, despite reassurances to the contrary. The rise in prices of nonferrous metals and soap created more nervousness than did other price actions. Yet the nonferrous increases reflected a natural upward bounce that was widely expected. Also in view of the shortages they have faced, attributed to price restrictions and high production costs, soap manufacturers were held to have good economic reasons for upping prices as much as they did. The moderate attitude toward price adjustments taken by the steel industry was commended.

In the nonferrous field it was generally accepted that producers merely were raising their prices to or near the world market prices and that as in the case of many other products whose prices were increased the law of supply and demand will shake them back to a lower level once an even pattern of marketing has been established. That this shakedown is expected is indicated by reaction of producers to price increases.

Lead and zinc producers say that they now will be able to get added raw material and also to obtain more scrap, and copper mining interests say that they will be able to get new production. The increases in consumer costs actually will not be as large as the actual price increases indicate. That is so because the heretofore quoted prices of nonferrous metals were the OPA ceilings which omitted the subsidies, yet the subsidies were paid out of a common treasury (supported by the public) to producers. Now the prices will be paid direct by consumers and as they rise the subsidies decrease. Mines in the so-called "A" quota likely will be cut off almost entirely from the subsidies with the price rise.

BECAUSE it is a bellwether of the national economy the restraint shown by the steel industry toward price readjustments was given particular significance. It is expected to have a big influence in holding down price increases of the multiplicity of finished products of which steel is the only or chief component. Assurances that steel contemplated no across-the-board price increases but would confine them to what are now nonprofitable lines was recognized as a sound policy of giving equal treatment to all classes of consumers. The position taken by the industry since decontrol is the same as it had taken when it was preparing to ask OPA for price adjustments.

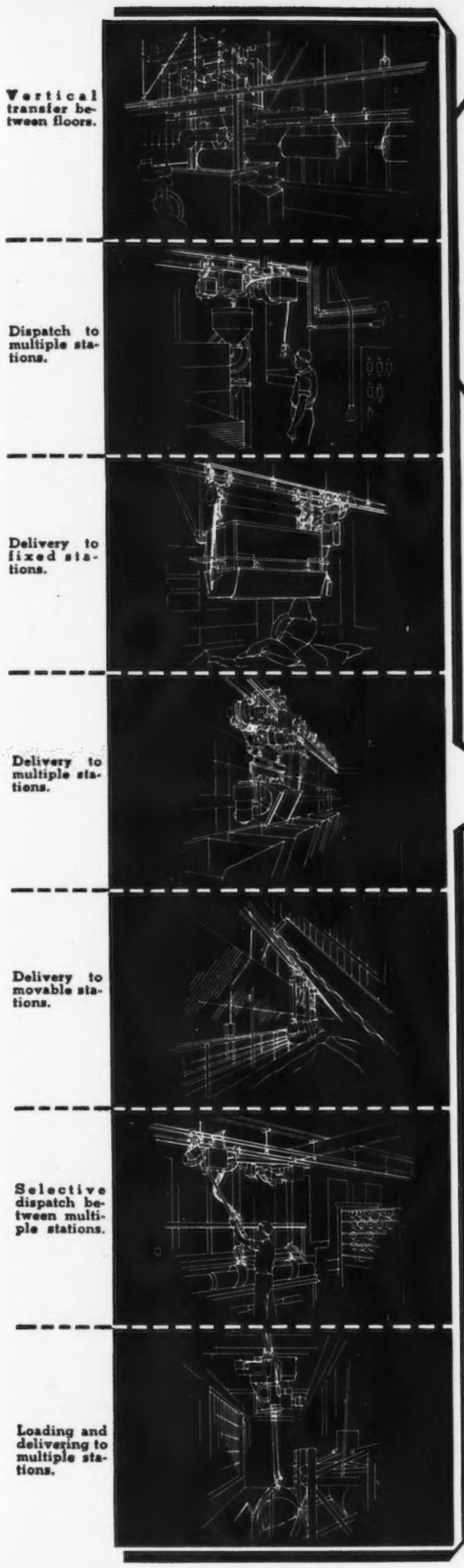
John D. Small, CPA head, has expressed pleasure at the reaction of the country to price control.

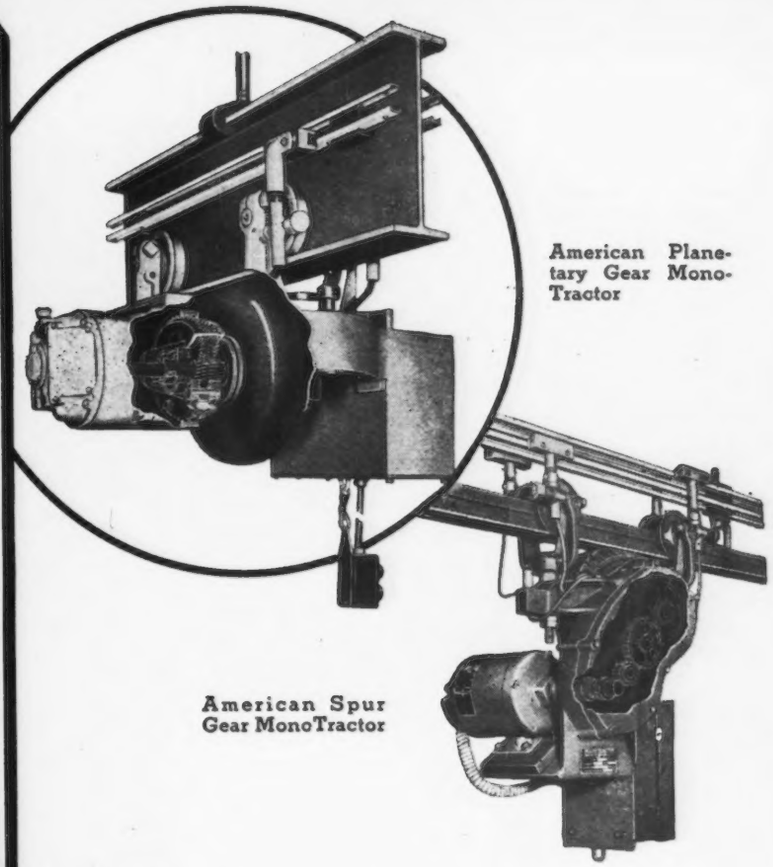
"I have talked to many people in both labor and management and my general impression is that they are all anxious to see us go forward without major upsets," he said. "A lot will depend on how high prices go up. If business uses restraint in price increases, we have a much better chance of getting through this than we would otherwise. Present peak production and virtually full employment can continue if major labor disturbances are avoided and I think that with the lifting of price controls, we have a good chance of avoiding them."

THE disturbing factor in industry relates to labor demands. Should they be excessive and be met it is obvious that further price increases would have to be made and the wage-price chase continued until it runs head on into an uncontrollable inflation. There is a mixed feeling here toward the direction being taken by organized labor. CIO President Phil Murray has insisted that USW is going to make "healthy" demands both as to wage increases and other benefits on the steel industry. Likewise, UMW President John L. Lewis is pressing for increased wages and making other demands which would involve high costs that only could be met by constantly rising prices that ultimately would be unbearable.

In other industries there also is a swelling of demands by organized labor. On the other hand, some leaders show a more moderate course because they realize, as does Dan Tobin of the Teamsters Union, that unless there is a letup and reasons shown with respect to both wages and price the country will be thrown into chaos. There also are likely some leaders who are being restrained from pressing further demands because of fear of forthcoming labor legislation. It will not be drastic legislation but it will put a stronger curb over labor than now exists.

As to shooting up prices unreasonably industry is well aware that it will mean rising wages and other costs, and thus mean nothing profitwise. Going too far, it is realized, means the usual boom and bust, disastrous to industry, labor and the country. When they reach a certain point, a point where the strain is beyond the endurance of the buyer's pocketbook, industry knows only too well from past experience that it is faced with the most devastating of all strikes—a buyer's strike. The steel industry met with such a strike in the fall of 1920. It was no more to be criticized for high prices than were


Vertical transfer between floors.
Dispatch to multiple stations.
Delivery to fixed stations.
Delivery to multiple stations.
Delivery to movable stations.
Selective dispatch between multiple stations.
Loading and delivering to multiple stations.



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large consumers who, as long as they had markets, demanded steel at any price.

BUT the inevitable happened. A buyer's strike developed and spread to all industries with a resulting depression, unemployment, and financial losses.

It was in that period that the dread disease "cancellitis" created a well-known gag that has become a classic in the steel industry. Consumers were smothering mills with cancellation orders dispatched by letter, phone, telegraph and all other means of communication.

Harried officials were almost beside themselves as they saw business rush pell-mell from a high peak to a mere trickle. But one Mahoning Valley executive, blessed with an unusual sense of humor, kept his balance. To a telegram asking for cancellation of an order at once, this executive dispatched the following reply:

"Cannot cancel your order at once. You must await your turn."

Industry as a whole evidently does not again want to see another cancellitis waiting line.

WAA Refuses Bids On South Chicago Plant

Chicago

• • • **WAA refusal,** for the second time, of all bids on the government plant now operated by Republic Steel Corp. at South Chicago has developed into a very intricate game of contract. With the rejection of the new offers, the agency asked that the bidders resubmit more reasonable proposals.

In turning down the proposals, WAA's real property board emphasized to the bidders that the plant must be awarded to a group thoroughly qualified to operate the plant. The highest bid of $28,250,000 made by Philip D. Fitzgerald, of J. Clark Chester & Associates, Chicago engineers, was not as high as that of Republic Steel, which for the second time, offered $30 million on a lease basis. John W. Turkovich and Mr. Fitzgerald will be asked to make more detailed statements as to their qualifications to operate the war-built mill.

Conclusions here are that WAA would prefer the property to go to either Republic, Kaiser-Frazer Corp., or the Central Steel Tube Co.'s interest, and are hoping that these qualified parties will see fit to hike the price they are willing to pay. New offers are to be submitted by Dec. 5 to Washington and will not be treated as sealed bids but as open proposals so that the sooner they are received, the sooner the agency can make its decision on disposal of the property.

In the notice of rejection, WAA specified that the minimum rental it will accept is $1,800,000 a yr on the basis of the rated ingot capacity of the plant.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

YOOH-HOO, MABEL -- COME ON, LE'S WATCH TH' SPARKS FROM TH' VILLAGE SMITHY'S FORGE -- THE SMITHY DON'T MIND, DO YOU, KIND SIR?
KIDS THEM DAYS DIDN'T HAVE MUCH TO ENTERTAIN THEM, DID THEY?
NO, YOU HADDA HUNT FOR IT -- NOW YOU HAFTA HUNT A PLACE TO GET AWAY FROM IT!
T. M. REG. U. S. PAT. OFF.
MEMORY'S GARDEN
11-22
J.R.WILLIAMS
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New CPA Amendment Cuts Buyer Searches Through WAA Stocks

Washington

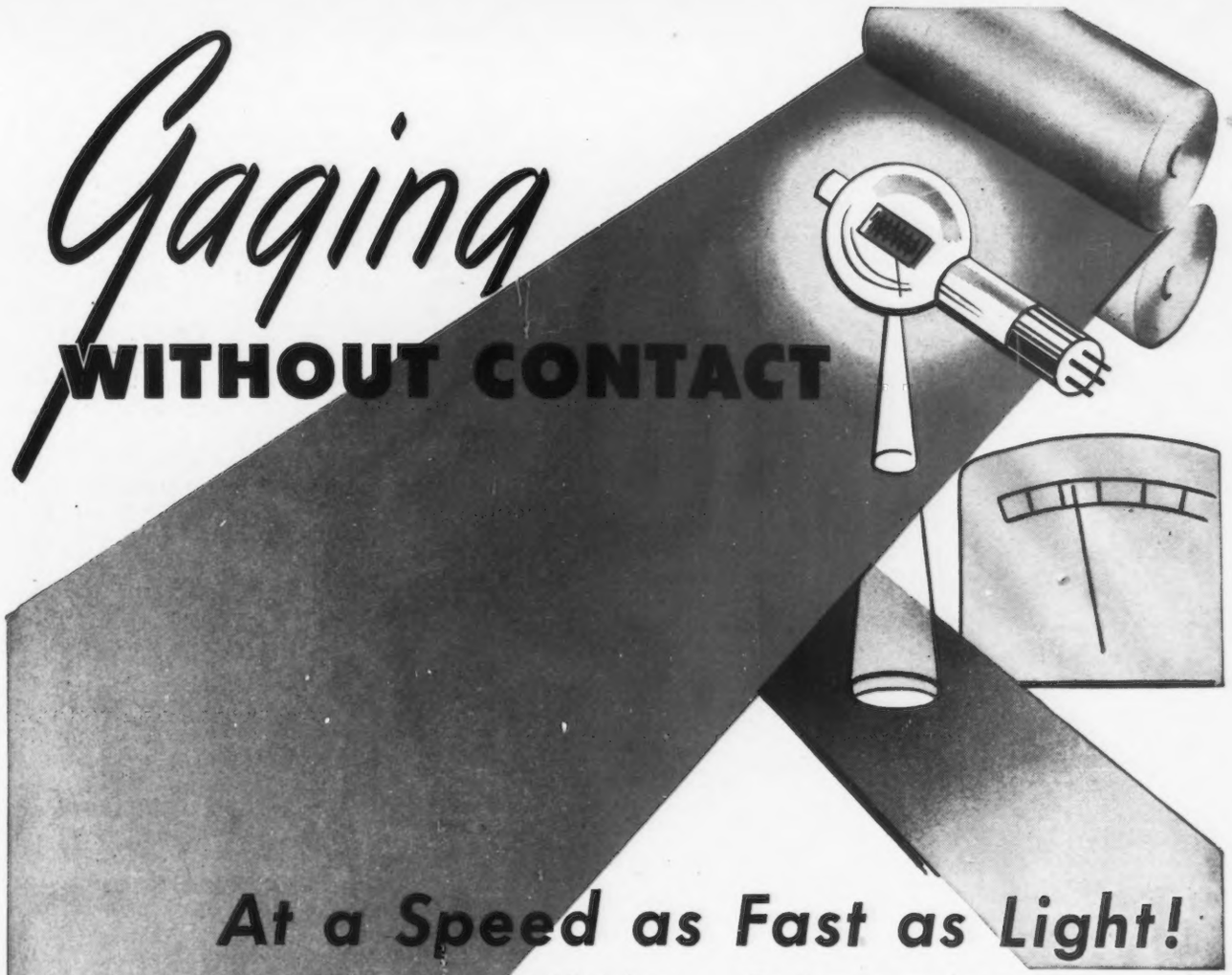
• • • **CPA has announced** that the holder of an urgency certificate against government surplus property no longer need present it immediately to WAA's regional office, or personally search for the material or equipment called for by the certificate.

Hereafter, under an amendment to Direction 16 to PR-13, when an urgency certificate is issued by CPA, the original will be forwarded to the applicant and two copies to the Public Interest Div. of the WAA regional office in which the applicant's plant is located.

This new procedure, developed in cooperation with WAA, provides that on receipt of the copies WAA will search its inventories in the regions designated and when the material or equipment is located, the certificate holder will be notified to come in and complete the purchase.

In general, CPA urgency certificates have been issued only to producers of the critical products listed on Schedule 1 of PR-28 such as certain building materials, fractional-horsepower motors—and to certified war contractors. The new amendment provides that in certain other exceptional cases, CPA may issue urgency certificates for materials or equipment absolutely necessary for critical products or services.

Gaging WITHOUT CONTACT



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Hot sheets or strips of metal or foil flying from the rolls; paper emerging in a never-ending sheet; or the plastic or rubber blanket flowing from a calender, may be checked instantly for thickness, and this thickness controlled during the process, by the Sheffield Measuray.

Temperature of the material to be checked and its speed of movement do not affect the accuracy of the thickness check. Proximity of gaging head to material is not important—it can be as much as a foot or more distant, depending upon the application. Amplification and sensitivity are available in excess of any known industrial requirements without sacrifice in speed, range, or dependability. For instance, it is possible to amplify one per cent of the thickness of the stock being checked to extend over the full scale range.

The Measuray may be mounted on a production machine, or it may be used at the bench to measure stationary objects, especially those whose surfaces might be marred by a contact gage, or those of such resiliency that the contact gage measurements are not practicable.

See the Measuray demonstrated at the Sheffield plant in Dayton. Bring samples of work to be checked to see for yourself the savings in material and time, elimination of losses in destructive testing, and the increase in uniform quality which the Sheffield Measuray can bring you.

If a visit is not convenient, write us for detailed information. For an early installation, ask for a survey to be made in your plant by Sheffield engineers—no obligation on your part.

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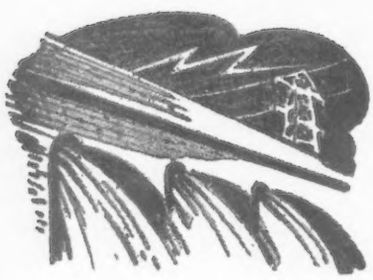
West Coast . . .

ROBERT T. REINHARDT

• Shipbreaking, looked upon as only immediate hope for ample scrap, delayed by governmental red tape . . . World's largest transport plane is flying hotel.



SAN FRANCISCO — While charging boxes were loaded with sugar tongs and several West Coast openhearths were cold, thousands of tons of select iron and steel scrap were collecting barnacles in San Francisco Bay.

This situation isn't making life any more pleasant for steel plant buyers who hold but little hope that the lifting of price ceilings will bring in more scrap. In general, it is the consensus of purchasing agents that while the Coast price has risen $2.50 a ton for top grades, there will be but little response from dealers primarily because there isn't any farm and automotive scrap to be had regardless of price.

One buyer, going as far afield as Hawaii, reports that over there large tonnages of war scrap are available at $14.00 a ton but that to bring it over here and get it to the mills would mean a delivered price of about $30.00 per ton. This is the tonnage purchased by the Calumet Steel Supply Co. from the government.

The principal openhearth operators on the Coast are pessimistic over the immediate future. Kaiser Co., Inc., is operating only 4 of its 6 openhearths. Bethlehem Pacific Coast Steel Corp. is looking forward to a 25 pct reduction in its operations here and in Los Angeles and Seattle, and Columbia Steel Co. fares a little better because of its greater dependence on its pig iron supply from Utah.

THERE is general dissatisfaction with the shipbreaking program. Both the Maritime Commission and the War Assets Administration are being severely criticized because of the slowness with which ships are being made available for junking and yards released or offered for shipbreaking.

As near as can be determined by a local survey, only 15 major ships have been released for scrapping here and about 10 more are up for bid. Each of these ships can produce approximately 3500 tons of scrap.

With more than 350 ships of all classes, conditions and ages at anchorage in Suisun Bay and with idle shipyards in the area, there seems but little excuse for delaying shipbreaking operations.

Kaiser Co., Inc. has broken up one 11,000 ton tanker at its Richmond Yard Three for American Iron & Metals and is to start immediately on another for National Iron & Metal Co. The Fontana Steel plant of the Kaiser Co. benefits from both operations.

Other California shipbreaking activities include those of the National Iron & Metals Co. to be started at Calship yards in Los Angeles in December; American Iron & Metals at the Graham Industries yards in the East Bay; Franklin Iron & Metals Co. of New Jersey which has been reported as having made a satisfactory offer for Richmond Yard Four; and Salco which is to beach and break up 12 submarines.

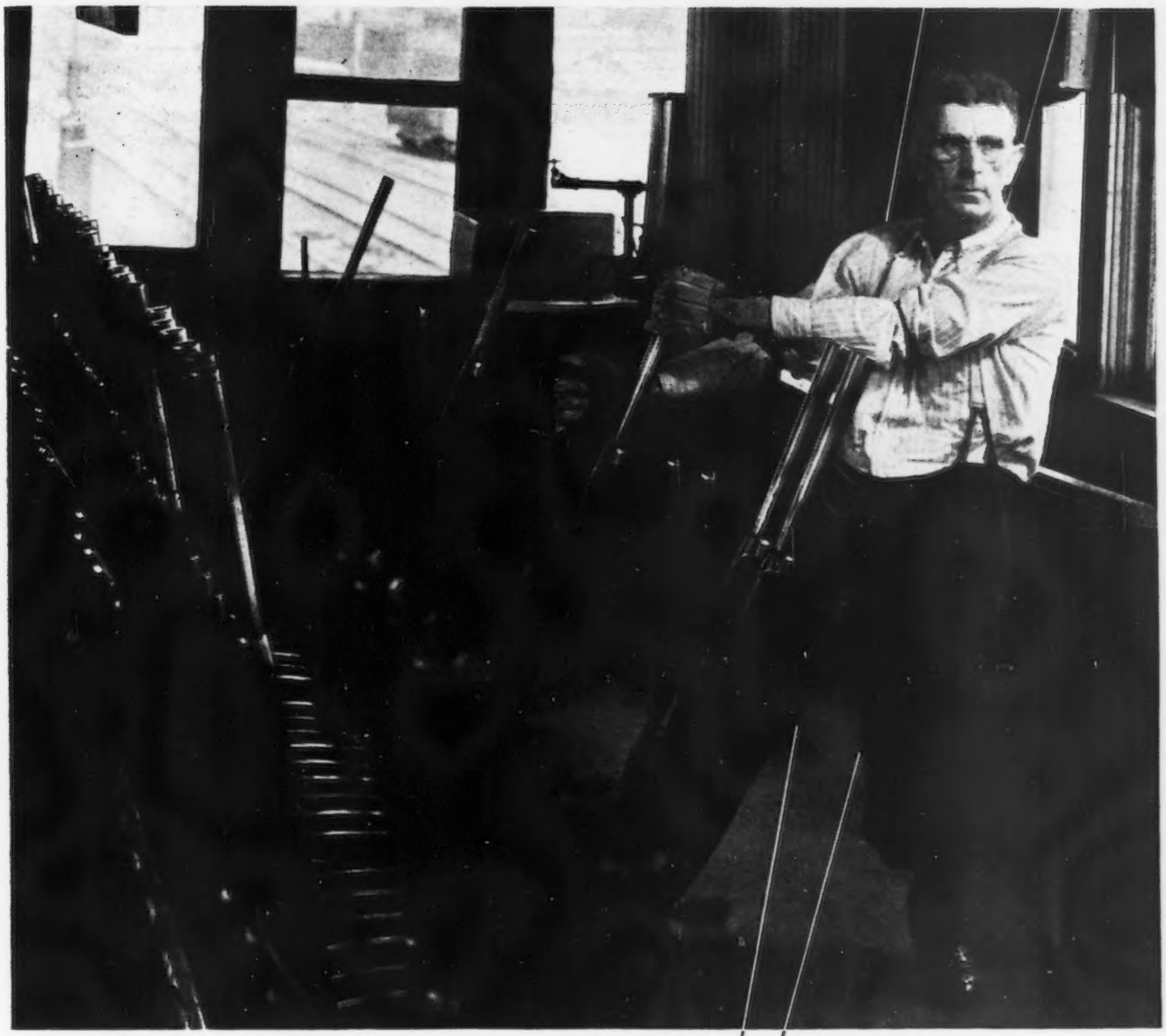
Interested persons point out that these operations are actually minor in scope in view of the obsolete ships tied up and the facilities at hand for their handling. These critics point out that there have been needlessly long delays on the part of the WAA in getting yards into the hands of willing operators and cite as an example the Pollack yards in Stockton, Calif., which were declared surplus in April and not cleared with the WAA until September. Offers made by would-be shipbreakers for these yards have been hanging fire since Oct. 8 because of red tape. A more rapid clearance of such facilities would be an important step in increasing the scrap supply, most observers believe.

WHEN asked about the delay in putting ships up for disposal as scrap, the local Maritime Commission officials point due east to the Division of Vessel Disposal in Washington. It is this group which must put the finger on ships doomed for the openhearths.

Whether the recent inspection of the scrap situation by Edward Greb, iron and steel salvage officer of CPA, and the appointment of a local salvage officer here with authority to designate any government property as scrap will produce results, is being watched with interest. It is generally believed this section will greatly facilitate the movement of thousands of tons of still undeclared surplus which is lying around government camps and shipyards.

One competent observer is of the opinion that with the present operators in the field, shipbreaking should yield about 3000 tons of scrap per month and that if the release of ships increases and two other large specialists in this work are successful in obtaining facilities, this tonnage will increase to 18,000 tons per month by next March.

Scrap dealers offer diverse opinions on the effect of the price increases established here last week. Most of them seem to think that truckers will now be more willing to go into the byways and corners in search of auto bodies and farm machinery as they stand to make a reasonable profit on operations. However, few dealers expect anything approaching market satiation. One dealer, with a relatively large operation at present heavily involved in junking street cars, was frank in express-



Split-Second Switchman

One false move... one split-second mistake in selecting the right switch, the right signal... and the yard jams. Roaring trains come to a grinding stop. Signal boards up and down the line flash red. It is long experience that has taught this railroad tower signalman how to keep traffic moving safely and surely through his "plant" ...long experience in selecting the right series of switch levers at the right time.

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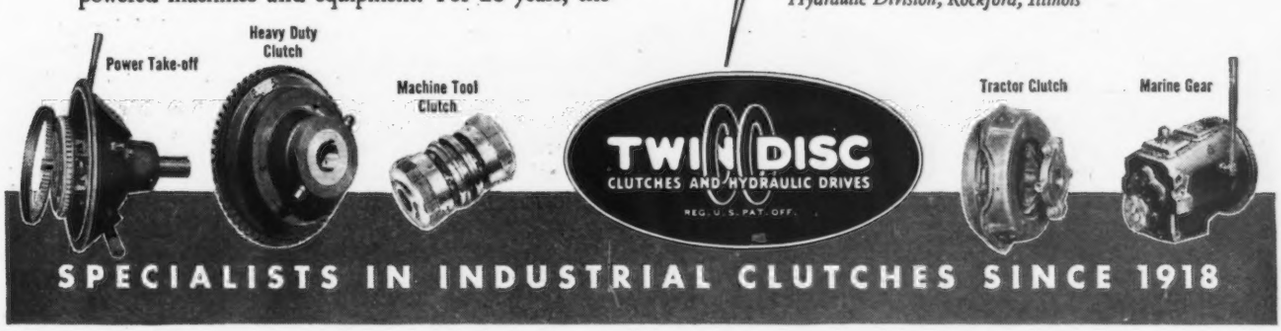


SPECIALISTS IN INDUSTRIAL CLUTCHES SINCE 1918

ing his disapproval of the price increases on the grounds that the junk business along with others should hold the price line as a step in preventing inflationary spirals.

Operators of electric furnaces on the Coast have been having a particularly tough time getting suitable scrap and most of them are pessimistic although they admit it is too early to tell what effect removal of price ceilings will have.

LOS ANGELES — Lockheed's Constitution, the world's largest transport airplane, built to carry 180 people, gave an indication of what's ahead in luxury airliners as it successfully completed its first flight at Burbank, Calif. As a luxury passenger liner, the 92-ton ship will provide sleeping accommodations for 100, lounge rooms, telephone system, air-conditioning, glare-free lighting and a "restaurant" equipped galley.

Rear Admiral J. W. Reeves, Jr., Commander, Naval Air Transport Service who is to receive the Constitution for the Navy, hopes to be able to place the plane in scheduled operation by the middle of 1947. Lockheed will perform tests on the ship for the next six months. Overall cost for two Constitutions is $27 million.

Designed for transoceanic ranges up to 6000 miles, the plane has a speed of 300 mph. Hall L. Hibbard, Lockheed vice-president in charge of engineering, stated that with the use of jet power plants, the speed of the plane could be increased to 400 mph.

Measuring 156 ft in length, and having a wingspan of 189 ft and a tail 50 ft in the air, the giant ship is designed with the latest scientific developments: Hydraulic-boosted control surfaces, eight-wheeled main landing gear, automatic fire detection system, cabin pressurization and thermal anti-icing, unit. Four Pratt & Whitney Wasp Majors develop 12,000 hp.

Admiral Reeves pointed out that although the plane is constructed to carry 180 passengers, under emergency conditions and for short hauls, 400 men could be crowded into the hull.

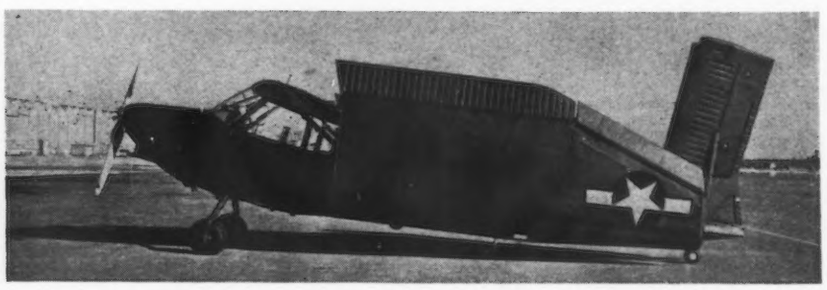
PACIFIC TUBE CO. has acquired from the War Assets Administration their wartime operated plant which is now in large-scale production of seamless alloy tubing, seamless stainless steel tubing and coldfinished bar stock for industrial use. Purchase price was $1,525,000 for plant and equipment.

John J. Buckley, vice-president and general manager, will head the staff here with Weir P. Armstrong as sales manager and Edgar H. Lloyd as plant superintendent. G. C. McEvoy is assistant treasurer.

SAN DIEGO — America's first all-metal liaison plane, with folding wings—the L-13—is now in production at Consolidated Vultee Aircraft, San Diego division.

This plane can be used for observation, communication, photographic work, wire laying, courier service and light cargo transportation. Its cabin can be converted quickly into an ambulance with space for two litters. Three crewmen are carried in normal operation, but six can be accommodated in emergencies.

Length of the L-13 is 31 ft 9 in.; wing span, 40 ft 5½ in.; and height, 8 ft 5 in. Gross weight is 2900 lb and useful load 1012 lb. It cruises at 92 mph, having a 368 mile range with 46-gal of fuel. Auxiliary tanks almost double the range. Service ceiling is 15,000 ft.



METAL LIAISON PLANE: *America's first all metal liaison plane, a Consolidated Vultee L-13 which can take off in only 230 ft and land in 227 ft. Its folding wings permit it to be towed over the road or hauled in a truck. It can also be towed by another plane, glider fashion. Powered by a 245-hp Franklin engine, it has a 368-mile range.*

SALT LAKE CITY—The left wing apparently strengthened its grip on the CIO International Union of Mine Mill & Smelter Workers in the recent election of officers and board members. Reid Robinson, who has been under fire within the union for leftist tendencies, was reelected on a basis of the unofficial returns. The official vote canvass will not be made until Dec. 1.

The Robinson leadership was challenged by James J. Leary, former international secretary who ran for the presidency. In the Leary corner were Dan Edwards, executive board member for district two (Utah, Nevada, Arizona, New Mexico and Texas) and Ralph Rasmussen, international vice-president, both of whom sought reelection. But the Robinson forces polished both off, along with Mr. Leary. Mr. Rasmussen and Mr. Edwards, both of Utah, ran strong in Utah and Nevada locals but were overwhelmed in the southwest. Mr. Rasmussen was one of the leaders in a move to oust Robinson for alleged solicitation of loans from an official of a company with which the union had contractual relations.

Speedy Scrapping Of CPA Urged by Small

Washington

• • • **In a new attempt** to fold up his agency before its expiration date next Mar. 31, CPA Administrator John Small has set up an informal committee to decide what remaining controls can be discarded, when they can be eliminated, and what agencies should get the left-overs when CPA expires.

The group is headed by Lucius Foster of the Priorities Bureau and is composed of the various Bureau and Division chiefs.

It is indicated that Mr. Small wants speedy scrapping of remaining controls, having them reduced to a minimum by the end of the year at which time he wants to be ready with demobilization recommendations to the President.

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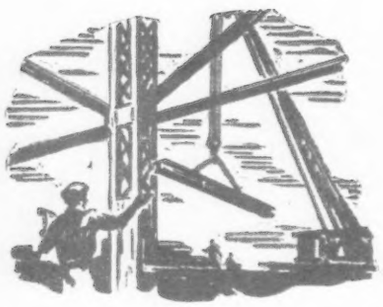
European Letter

JACK R. HIGHT

• French progressing slowly toward prewar normalcy with labor shortages constituting a serious handicap.



PARIS—Progress towards the mythical "normal" existence is inevitably more noticeable to the occasional visitor than it is in London where I am frequently. Most startlingly, the food situation has improved here in the last four or five months. The tinned American meats which were so popular last spring are now standing unwanted on the shelves, while there is a greatly increased supply of fresh meat.

Currently, some of the same problems that have plagued the American meat supply are threatening the distribution system in France, with the farmers carrying on an organized seller's strike in protest against government food ceilings, but the government is following a vigorous policy in this regard. Instead of giving in to the lobbyists, it is planning to import foodstuffs.

The Provisional Government early this year appointed a committee to draw up a 5-yr plan for all industry with priority to be given to steel, electricity, coal, transport and cement industries. Eighteen separate commissions have studied the industries involved, and the iron and steel section of this report appears elsewhere in this issue of THE IRON AGE.

The report was also expected to detail the plans for the allocations system for raw materials to these industries, summarize the import needs and also outline the amount of exports that these key industries may be expected to contribute to the national total during the modernization period.

The commissions have been composed of industrialists, farm owners, workers and civil servants. Eugene Roy, general manager of the Longwy steel works, who is the head of the iron and steel industry commission, has already stated that the steel industry has gone beyond the terms of reference to prepare a 10-yr plan for the industry which will cost approximately 70 billion francs ($588,000,000 at the present exchange rate. This compares with $672,000,000 the British steel industry plans to spend in the next 5 yr.)

UNTIL the present time most of the local interest in the modernization program has centered around the financial and raw material supply programs, but the publication of the latest manpower statistics for France foreshadow another potentially serious problem that may set back the schedule. According to the statistics for the entire country there are only 600 unemployed in the metals industries, and less than 10,000 unemployed in all industries in the country. This figure is said to be made up of people about 50 pct of whom are over 60 yr of age. Against this situation, it must be remembered that French economy is still only producing at about 80 pct of the 1938 levels, and that large numbers of prisoners of war are still being used in French industry.

There will be considerable incentive in the face of the unhappy manpower statistics to speed up the modernization program for all industries, as one of the major objectives in carrying it out is to save manpower, if the manpower can be found to push it forward. The French press is apprehensive about the future of the German prisoners of war, as America has already sent back those who were in the United States, and Great Britain has started a repatriation program that, in spite of its slowness, will see the last of those held in the United Kingdom by late 1948. Significantly, when the Labor Government in Britain announced its plan to silence increasingly noisy moralists, it stated that as a matter of official policy it would try to encourage other countries to also adopt a positive repatriation program.

The French consider the percentage of women employed in the British steel industry to be remarkable. In a visit to a French mill this week, I saw not a single woman at any job save a routine stenographic post.

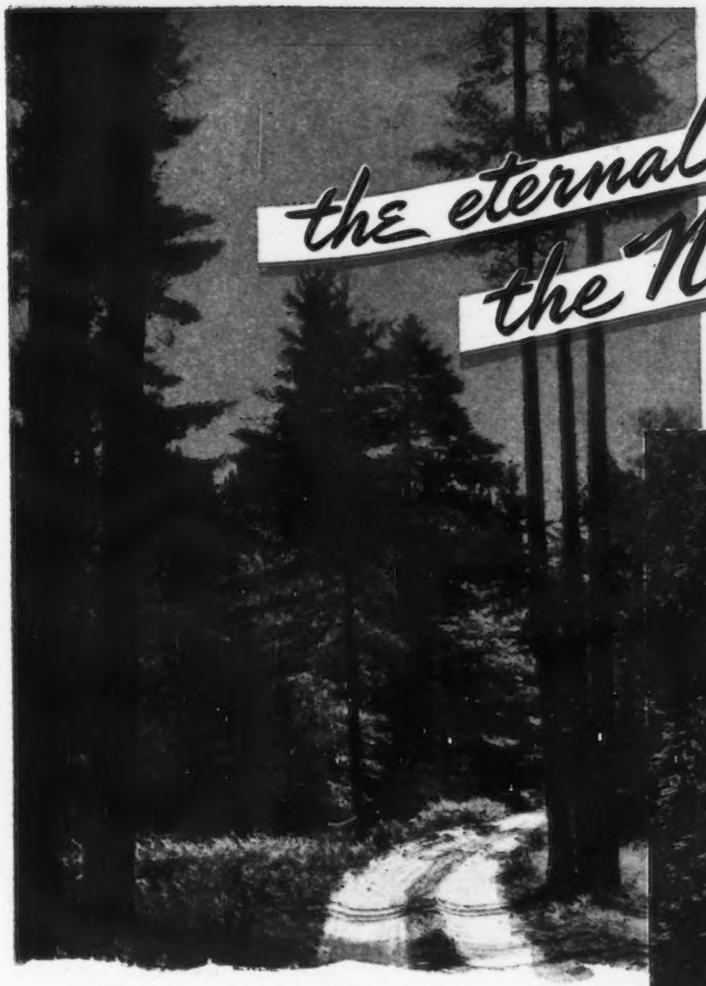
THE French deficit in manpower in metallurgical industries is officially estimated as follows:

(000 omitted)

	1946	1938	Deficit
Iron and steel	117	160	43
Foundry	57	104	47
Farm equipment	27	40	13
Automobile	77	94	17
Dock Yards	26	36	10
Engineering	690	800	110
Armament manf.	70	70	..
Machine tools	39	29	+10
Aeronautical	100	57	+43
Total	1,203	1,390	—187

According to the French Minister of Population the working force (aged 20-59), following war casualties, was 300,000 less at the beginning of 1946 than at the beginning of 1939. The numbers of younger people up to 19 yr decreased in the same period from 12,800,000 to 11,775,000. His estimate of the total national manpower deficit is 1,500,000.

French pressure for increased supplies of coal from the Ruhr continues, although there is no direct answer at present to the manpower problem. If the raw materials were made available immediately to increase industrial output to 1938 levels, it is doubtful that the manpower is available. The question of productivity per manhour is the subject of constant discussion among interested parties, as there is no doubt that, as everywhere in the world, it is far lower in postwar than in prewar France. There is also some public



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discussion of reducing the percent of the population not engaged directly in production, such as the civil servants, merchants and others. Realists generally doubt that much can be accomplished in this direction without compulsion.

THE employment of additional women in industry has already been encouraged by dropping the 10 pct wage differential which was formerly maintained against them, but substantial progress in this direction is barred by the present government's family policy. The government is encouraging large families with substantial allowances, and prefers French women to devote their energies to such matters.

The importation of manpower will probably be the most successful method of increasing the total labor force, as it was before the war. There is talk of making the German prisoners free men under contract, and of bringing in Italians and North Africans. Belgians and Luxemburgers already cross the frontier daily to work in near-by French mills, but the exchange problems which have been a dilemma recently are awaiting a settlement.

A national immigration office conducts the negotiations for the importation of labor, and an employer pays 6000 francs per man to the government to cover the overhead for this office. The recently announced French-Italian agreement for the shipment of 20,000 miners to France still lacks certain fine polishing, but about 1000 miners have already arrived and some 4000 who made their way across the frontier on their own have been made legal under the terms of the agreement. The Italian workmen receive the same wages as Frenchmen, benefit by the family allowances which they are permitted to remit to their families in Italy, and are permitted to change a proportion of their income to lira, whether they have families or not. The immigration office has also arranged for the arrival of 1500 French Moroccans for work in the Boire coal mines.

HOUSING poses a serious problem for the imported labor, as the situation has by no means been solved for French labor in the devastated areas. The Italian Government is imposing strict rules on this subject as far as its nationals are concerned. The French officials are making use of abandoned army installations, many of which were purchased from the U. S. in surplus deals, but many of these are fixed installations inconveniently located from the works. As a result, some firms have arranged to transport their labor by bus as far as 60 miles each way every day.

In the social legislation that has been passed by the French Government is a broad apprenticeship program that in the steel industry is financed by a 35 franc per ton tax on steel, paid by the consumer. There is a central organization for the program in the steel industry which supervises the establishment of schools in each firm. The boys start their course at 14, which is the "leaving school" age for the average student, and enter into a 3-yr training period that includes considerable physical training in the early period.

I had the opportunity to visit such a school this week at the Valenciennes works of the Forges and Acieries de La Nord et l'Est recently. The youthful appearance of the boys was surprising, but I found the new, light and airy surroundings almost like an ideal vocational high school that might be found in a large city in America. The enthusiasm on the soccer field was certainly as great.

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OLD IRON: *William Roberts, 79-yr-old British craftsman who was called from retirement is restoring the 17th century wrought iron screens that formed the gateway to the Barge Walk at Hampton Court.*

o o o

U.K. Mercury Price Down

London

• • • **Following the** reduction in price of the British government-owned stock of mercury metal from $120 to $100 per 76-lb bottle as from Oct. 30, the British Board of Trade has now decided that the import of mercury shall revert to private trade as from Nov. 7. Supplies of mercury may still be obtained from the government store until such time as consumers are able to make their own buying arrangements which it is hoped will be before the end of this year.

YOUR steel requirements can best be served by a progressive, superbly staffed, completely integrated steel producer. WISCONSIN is exactly that.

Progressive is more than a word at WISCONSIN. It's a *fact* that has been demonstrated by our development of Sulfite-Treated Steel—the highly machinable steel that overcomes the faults of resulphurized steels. "H" steels of guaranteed hardenability are a specialty of ours. Both of these steels are earning wide acceptance and acclaim.

Superbly Staffed by top-flight steelmen, WISCONSIN has one prime objective: to make the best possible steel for our customers. Every man in the mill works toward that goal.

An Integrated Organization gives WISCONSIN complete control of the product from the ore mines to the customer. That control means finer steel.

Watch WISCONSIN for steel progress. We can't supply all the steel our customers need but the picture is improving. We haven't compromised with quality. Our sales and metallurgical staffs are ready to serve you.

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WISCONSIN STEEL

PERSONALS

o o o

• **Carl R. Sare,** formerly vice-president, has been elected president and a director of the Morrison Engineering Corp., Cleveland. He began his career with the A. M. Byer's Co. as a service engineer and following this served Jones & Laughlin Steel Corp. as a sales engineer. Prior to joining the Morrison Engineering Corp., he was associated with the American Steel & Wire Co. as a production executive.

• **W. C. Erkert,** director and purchasing agent of the Keystone Steel & Wire Co., has been named director of purchases. **F. A. Little** has been appointed to the position of purchasing agent. Mr. Little was a Keystone Steel & Wire Co. sales representative in the Minneapolis area for 4 yr, then district manager of the Chicago office, before becoming assistant purchasing agent in 1941.

• **Frank L. Magee,** general production manager for Aluminum Co. of America, Pittsburgh, has been elected a vice-president. He will continue in his present duties, reporting to I. W. Wilson, vice-president in charge of production. Mr. Magee joined the company in 1917 as a sales apprentice. He continued in sales work in various company sales offices until 1937 when he left the district managership of the Atlanta sales office and came to Pittsburgh to become manager of sheet sales. In 1943, Mr. Magee became general production manager and assistant to Mr. Wilson.

FRANK L. MAGEE, vice-president, Aluminum Co. of America

• **John S. Hutchins,** president of Ramapo Ajax Div.; **William T. Kelly, Jr.,** president of the Engineered Castings Div. and the Kellogg Div.; **Thomas W. Pettus,** president of National Bearing Div., and **Joseph B. Terbell,** executive vice-president of the American Manganese Steel Div., have been elected vice-presidents of the American Brake Shoe Co., New York. Mr. Hutchins has been with Brake Shoe for 21 yr working mainly in a sales capacity. He was promoted to a vice-president of Ramapo Ajax Div. in 1944, and elected president of the division in 1945. Mr. Kelly was Brake Shoe's general purchasing agent for several years before becoming president of the Kellogg and Engineered Castings Div. He joined Brake Shoe in 1928. Mr. Pettus, president of the National Bearing Div. since 1945, has worked for Brake Shoe successively as sales representative, sales manager, priorities administrator, vice-president and executive vice-president of National Bearing Div. Mr. Terbell has been associated with various divisions during his career with Brake Shoe, mainly in a sales capacity. In 1940 he was promoted from a district sales manager's position to vice-president of the American Manganese Steel Div., and in 1945 to executive vice-president.

• **Homer Parsons** has been named assistant director of exports of American Brake Shoe Co., New York. He has been a sales representative for Brake Shoe's export department since August 1945.

• **T. S. See** has been appointed first vice-president and general manager, and **A. Frank Golick,** vice-president in charge of sales of La Salle Steel Co., Chicago. Both men have been with the company for a number of years.

• **Ross W. Swogger** has been appointed export manager of Speco, Inc., Cleveland. Prior to joining Speco, Mr. Swogger was export manager of the Oster Mfg. Co., with which he was affiliated for over 20 yr.

• **C. F. Borden** has been appointed assistant general sales manager and **R. L. Asquith,** product sales manager, tubular and specialty products of Kaiser Co., Inc., Iron & Steel Div. Mr. Borden will continue as Oakland district sales manager in addition to his new responsibilities. Both men will headquarter in the Oakland, Calif. office. Mr. Borden has been associated with the Columbia Steel Co. and the Geneva Steel Co. prior to his joining the Kaiser Co. in 1945. Mr. Asquith was formerly associated with the Oil Well Supply Co. and Columbia Steel Co. and served in the U. S. Navy. After his return from duty in 1945 he became connected with the Kaiser organization.

• **Arthur H. Kibiger** has been named director of styling for Willys-Overland Motors, Inc., Toledo. Mr. Kibiger has for the past 12 yr been assistant chief designer for the Hudson Motor Car Co. Prior to that he was associated with the Auburn Automobile Co.

• **Robert M. Hayes** has been elected secretary of Oliver Iron & Steel Corp., Pittsburgh. Mr. Hayes has been with the company since 1944 in the position of treasurer. **W. F. Roll,** who has been assistant treasurer, will serve, in addition, as assistant secretary. Mr. Roll has been with Oliver for over 44 yr, during which time he has served in many official capacities. Before joining the Oliver Iron & Steel Corp., Mr. Hayes was assistant treasurer of U. S. Steel Corp. of Delaware.

ROBERT M. HAYES, secretary, Oliver Iron & Steel Corp.

FRANK HUBERT, JR., traffic manager, Bethlehem Pacific Coast Steel Corp.

• **Frank Hubert, Jr.** has been appointed traffic manager for Bethlehem Pacific Coast Steel Corp. He was formerly in the traffic division of Bethlehem Steel Co.'s Houston office and with the Bethlehem Pacific Coast Steel Corp.'s Los Angeles office. Headquarters will be maintained in the San Francisco general offices. **Mr. Hubert** succeeds **George J. Sussman,** who has retired after 28 yr of service with the company. **E. N. Ferretta** has been named assistant traffic manager. He came with Bethlehem's traffic department in San Francisco in 1943 after having served 18 yr with the Southern Pacific Co.

• **Harold T. Burke** has resigned as assistant general superintendent of the Worcester Pressed Steel Co. to become associated with the Ingersoll Steel Co. of Chicago. He was with the Worcester company more than 20 yr.

• **Ray A. Obrecht** has been put in charge of the process engineering department of the Progressive Welder Co., Detroit.

• **Henri M. Marc** has been appointed assistant general manager of Portable Products Corp.'s C. J. Tagliabue Div., Brooklyn. He comes to Tagliabue from the Philip Carey Mfg. Co., Cincinnati, with which he had been associated since 1932 as assistant director of research. In addition to his managerial duties, Mr. Marc will act as technical adviser for all divisions of the corporation.

• **Edmond F. Ducommun** has been elected president of Ducommun Metals & Supply Co. of Los Angeles to fill the office left vacant by the death of Emil C. Ducommun. **A. W. Lohn** has been elected executive vice-president; **Charles E. Ducommun,** vice-president and treasurer; **Wayne Rising,** vice-president and general manager; and **Elmer Wall,** secretary and assistant treasurer.

• **Howard J. Jones** has been appointed manager of industrial relations for the Colorado Fuel & Iron Corp., Denver. For the past 12 yr he was associated with the Republic Steel Corp. in a similar capacity. He will head a progressive program of industrial relations. **Horace J. Jones** has been named manager of industrial engineering for Colorado Fuel & Iron. His knowledge was gained through 29 yr of experience with his former connection, the Republic Steel Corp.

• **Elmer Anderson,** formerly service engineer in the Milwaukee office of the Timken Roller Bearing Co., has been appointed assistant service manager of the Canton, Ohio office. He joined the engineering staff of the Timken Co. in 1929. From that post, he went to Milwaukee, where he has been service engineer since 1933.

• **J. Douglass Kirk** has been appointed to handle the sale of thermosetting molding materials for Monsanto Chemical Co., St. Louis, in the northern New England area. **Winston Richter,** who formerly handled both thermosetting and thermoplastic materials, will now devote his efforts entirely to the latter. **William H. Face** has been assigned to the southern New England territory for the sale of thermoplastic materials. **T. J. Martin,** who formerly handled both types of plastic sales, will now handle only the thermosetting type.

• **J. P. Simon** has been appointed manager of the Philadelphia district office of Cutler-Hammer, Inc., Milwaukee. In this position, Mr. Simon will have direct charge of all sales in the Philadelphia territory and will have supervision of the company's branch offices in Baltimore and Washington, and York, Pa. He has been a member of the Philadelphia district office sales force for more than 17 yr.

GILBERT SOLER, general superintendent, Atlas Steels Ltd.

• **Gilbert Soler** has been appointed general superintendent of Atlas Steels Ltd., Welland, Ont. He has been associated with the Republic Steel Corp. as research engineer and from late 1931 up to coming to Atlas Steels, he was with the Timken Roller Bearing Co., and recently held the position of assistant general superintendent of the steel division. **A. C. Texter,** on the supervisory staff of Atlas Steel Ltd., for the past 15 yr, has been appointed assistant general superintendent of the firm. From assistant melting superintendent of Park Works, Crucible Steel Co. of America, Mr. Texter came to Atlas in 1931 where he accepted the position of melting superintendent.

• **L. E. Batten** has been appointed director of purchases of the Nichols Wire & Steel Co., Davenport, Iowa. **F. P. Leahey,** formerly manager at the Battle Creek, Mich. plant, has been appointed general works manager, and will be in charge of manufacturing plants at Davenport and at Battle Creek. **R. J. Kahl** has been appointed manager, Battle Creek plant.

• **Charles W. Boll, Jr.** has become a member of the staff of the New York office of the Udylite Corp. of Detroit. He will operate in Virginia, Maryland, Delaware and part of Pennsylvania. Before entering the Marines, he was chemist with the Harrisburg Steel Corp.

• **George McB. Peters** has been appointed district manager for western New York and **Kenneth F. Vilsack,** district manager for Kentucky and southern Indiana for Geary Stainless Steel Co. of Baltimore. Mr. Peters was formerly with Rustless Iron & Steel Co. and Chandler Boyd Co., and Mr. Vilsack was formerly affiliated with Jeffersonville Boat & Machine Co.

• **Harry G. Smith** has joined the engineering division of Ford Motor Co., Dearborn, Mich., and will be in charge of Ford engine design, development and production refinement. He joined Hudson Motor Car Co. in 1918, and from 1922 to 1927 was associated with the Marmon Motor Co. as engine designer. In 1927 he became an engine and chassis designer for Studebaker; since 1931 he has been with Buick and has had charge of Buick engine design and development since 1936.

• **Philip X. Navin** has been appointed field engineer for the New York district of Goodyear Tire & Rubber Co., Akron, Ohio. He has been with the company since 1943, starting in Akron as an engineer for Goodyear Aircraft Corp.

• **Joseph S. Parry** has been appointed eastern district industrial manager of the Westinghouse Electric Corp., Pittsburgh, and **C. Swan Weber** has been named to succeed Mr. Parry as manager of the Westinghouse Newark, N. J. office. Mr. Parry will direct the sale of electrical equipment to industries in New York State, northern New Jersey and northeastern Pennsylvania. He has been with Westinghouse since 1920, and filled a number of sales posts at East Pittsburgh and in New York before being assigned to the Newark office as industrial supervisor in 1938. Three years later he was appointed manager, a position he has filled until now. Mr. Weber has been with Westinghouse since 1928, having begun as a graduate student at East Pittsburgh. Before coming to Newark, he was at the company's office in Washington for 15 yr, serving successively as a salesman, marine division manager and manager. He held the latter post 2 yr. **Richard M. Wilson** has been appointed manager of the company's Washington office. He joined the company in 1936.

J. T. MYERS, vice-president in charge of sales and production, Davey Compressor Co.

• **J. T. Myers** has been elected vice-president in charge of sales and production of the Davey Compressor Co., Kent, Ohio. Mr. Myers has been a member of the organization for the past 5 yr and in the past year has served as assistant general manager.

• **James J. Durkin** has been appointed district superintendent of all service shops of General Electric Co., for the Atlantic district, which includes shops in Pittsburgh, Philadelphia, Youngstown, Baltimore, and Charleston. Prior to this appointment, he had been superintendent of the Pittsburgh service shop of GE.

• **Charles F. Codrington** has been promoted from assistant to the manager to sales manager of the blower and compressor department of Allis-Chalmers Mfg. Co., Milwaukee, succeeding **A. E. Caudle,** resigned. Mr. Codrington joined Allis-Chalmers' graduate training course in 1930 and served in the engine and condenser department for some time before becoming associated with the blower and compressor department in 1935. **Albert R. Knauss,** formerly of the Tulsa district office of Allis-Chalmers Mfg. Co., has been named manager of the company's office at Memphis, Tenn. Mr. Knauss was connected with the Tulsa office from 1937 to 1941, when he entered the armed forces. He rejoined Allis-Chalmers following his release in October 1945.

• **Paul J. Lalonde** has been transferred from chemical research activities to engineering service and development for the electrotypers' and stereotypers' industry of the Hanson-Van Winkle-Munning Co., Matawan, N. J. **Dr. Otto Kardos** has been assigned to the post of research electrochemist for the study of plating solutions. **D. Gardner Foulke** has joined the H-VW-M technical staff as a process electrochemist. Until recently he was director of the analytic laboratory of Foster D. Snell, Inc.

• **W. Herbert Everitt** has been appointed to represent Hydropress, Inc. in the states of Washington and Oregon and British Columbia. The Hydropress representative office is located in Seattle.

• **Royal C. McCurdy** has been appointed research engineer for the Swenson Engineering & Mfg. Co., Detroit. He formerly was a research engineer for the Detroit Edison Co.

OBITUARY...

• **Frank A. Emery,** 78, for a time general manager of the Framingham Foundry Co. and for many years an executive of the Norton Co., Worcester, Mass., died Nov. 5. He was general manager of Norton Co.'s English office from 1919 until he retired in 1940.

• **Richard G. Woodbridge, Jr.,** technical specialist and former director of the old Brandywine Laboratory of the E. I. du Pont de Nemours & Co., Wilmington, Del., died Nov. 7 after a short illness. He joined the company as a research chemist in 1908.

• **J. Truman Evans,** manager of the locomotive sales department of Vulcan Iron Works, Wilkes-Barre, Pa., died Oct. 19. He had been connected with the company for more than 50 yr.

• **John D. Williamson,** for 23 yr New York district manager for SKF Industries, Inc., Philadelphia, died Nov. 2 of a heart attack. Mr. Williamson, who joined the company in 1918, had resigned Aug. 31 because of ill health.

An Invitation

Visit our Exhibit on the Stage at the
NATIONAL METAL EXPOSITION
Atlantic City, N. J., November 18-22, 1946

This exhibit, covering the entire stage of the municipal Auditorium, will show many examples of the advantages that Nickel offers your industry. Convenient facilities for discussing your problems with our metallurgists and foundry specialists, will be available.

THE INTERNATIONAL NICKEL COMPANY, INCORPORATED • 67 Wall Street, New York 5, N. Y.

Dear Editor:

POLISHED FLAT SPRING STEEL

Sir:

I would like to know who in the U. S. makes the best polished flat spring steel for making expanders to be used behind piston rings 0.015 thick in the following widths: 0.087, 0.12, 0.15 and 0.18 in. The best material that I have found has been made by a Swedish firm . . . but I understand that during the war some American products were developed that were supposed to be superior to the Swedish product.

G. M. M. GRANT
Grant & Grant
Los Angeles

● American Steel & Wire Co., Cleveland, manufactures a polished flat spring steel which is reported to be comparable to Swedish spring steel.—Ed.

FOUNDRY CONTROL

Sir:

Will you please send me "Foundry Process Control Procedures," described on p. 53 of the Sept. 5 issue.

M. R. NIMAN
Vice-President
National Foundry Co. of New York, Inc.
Brooklyn 5

● The booklet on foundry process control described in the news item in the Sept. 5 issue is available only through the Society of Automotive Engineers, at either its Detroit or New York offices.—Ed.

CARBOMETER SOURCE

Sir:

In the very interesting article on rimmed steel in electric furnaces by E. S. Kopecki, in the Sept. 26 issue, the use of a Carbometer for carbon determination was mentioned. Will you kindly advise me where this apparatus may be purchased?

F. A. DAVEY
Mansfield, Ohio

● The Carbometer is marketed by R. D. Bates, 921 Bergen Ave., Jersey City, N. J. —Ed.

AUTO HARDWARE

Sir:

Will you please forward two reprints of the article entitled "Polishing and Buffing Die Cast Auto Hardware," by Herbert Chase which appeared in the Sept. 5 issue on p. 58.

D. E. MERRIMAN
Purchasing Agent
Stanley Works
New Britain, Conn.

NEWSFRONT QUERY

Sir:

In "Newsfront" of the Oct. 10 issue is the following paragraph: "By combining into a production line arrangement an armor plate straightener and a new type fully automatic slab and billet grinder, an eastern steel producer has cut stainless slab preparation costs nearly $15 a ton." The items in "Newsfront" have always been of considerable interest to me and I would appreciate your forwarding me available information concerning the item quoted above.

G. D. DILL
Sales Engineer in Charge
Steel Division
American Foundry Equipment Co.
Mishawaka, Ind.

● The plant involved in that development has asked us not to reveal its name yet. However, we hope to be able to describe this arrangement in detail in the near future.—Ed.

SPEED REDUCERS

Sir:

Will you please advise us where we could locate suppliers of speed reducers which would give us a speed reduction of from 600/1200 to 1 rpm with a torque of 500 lb? We wish to contact manufacturers who produce these reducers as a standard product.

J. H. PATTON
Purchasing Agent
Hugh Russell & Sons, Ltd.
Montreal

● List of speed reducer manufacturers is being mailed.—Ed.

WELDING STUDENT

Sir:

Please send me one of your books called the "Directory of Tool Steels." I am in the arcwelding course at the Hobart Trade School now and I heard about your tool steel book here. . . .

T. YAMASHITA
Hobart Trade School
Troy, Ohio

OXYGEN ENRICHED BLAST

Sir:

We understand that during the war the Russians developed a method of producing a rich oxygen air for operating steel blast furnaces and iron melting cupolas, using large quantities of air for combustion. We do not have details on this method, but understand that the oxygen content of the air used runs around double the usual oxygen content. We would appreciate your sending us any articles in your magazine on this process.

R. H. SOLEM
Combustion Dept.
Eclipse Fuel Engineering Co.
Rockord, Ill.

● Long before the Russians, the Belgians in 1913 conducted an investigation of the possibilities of oxygen enriched blast. In 1936 the Russians reported on 4 yr of extensive research on this same subject. The Germans, too, have reported on a number of trial runs with oxygen enriched fuel. Nor is it an entirely new subject to American steelmakers who have been from time to time quietly running their own trials. However, the cost of bulk oxygen and certain refractory problems, among other factors, have militated in the past against widespread use of oxygen additions to the fuel. Recent developments which point to lower oxygen costs and more efficient introduction of the oxygen into the fuel have renewed interest in the subject. Literature on the subject is scattered through European and American publications. The following list of references, while not complete, will give an excellent background on the early work and will also show some more recent trends of thinking on the subject: "Technical and Economical Fundamentals of Use of Oxygen-Enriched Air in Blast Furnace," by M. A. Shapovalov, Teoriya I Praktika Metallurgii, 1938, vol. 9, Nos. 7-8, pp. 3-6; "Fuel Utilization in Iron and Steel Works," by N. H. Turner and F. A. Gray, Iron and Steel Institute, March, 1946; "Oxygen-Enriched Blasts Increase Furnace Capacity," THE IRON AGE, March 28, 1946, p. 62; "My Trip to Russia," by Irving Langmuir, Chemical Engineering News, March 25, 1946; "Dehydration and Oxygen Enrichment of Blast Furnace Air," Metallurgia, July, 1944; "Oxygen Enriched Blast Investigated," THE IRON AGE, Apr. 27, 1944, p. 54; Report No. PB-27007, Dept. of Commerce, Office of Technical Services, Washington 25, D. C.; "New Process Developed to Cut Melting Time of Pig Iron, Scrap," THE IRON AGE, Sept. 26, 1946, p. 123; "Oxygen for Industrial Uses," by Martin J. Conway, (AISE Report) THE IRON AGE, Oct. 10, 1946, p. 71. Highlights of recent tests are reported on p. 104 of this issue.—Ed.

REQUEST FROM DENMARK

Sir:

We have had the opportunity to see a reprint of "Precision Casting: Lost-Wax Process" and would be glad to receive two copies of the booklet, together with anything else you may have published on the subject.

K. LOTTRUP
Lystager
Copenhagen

● The 72-p. booklet, "Precision Casting: Lost-Wax Process," is available at $1.00 per copy. Copies have been forwarded.—Ed.

VITAL NECESSITY

Sir:

The series of articles entitled "A Critical Survey of Controlled Atmospheres" by Funk and von Ludwig is of great value. This is the type of information which is of vital necessity to do a job better and then understand why it is better. I would appreciate receiving tear sheets of the three articles.

G. W. LAPIER
Plant Metallurgist
Cleveland Graphite Bronze Co.
Cleveland

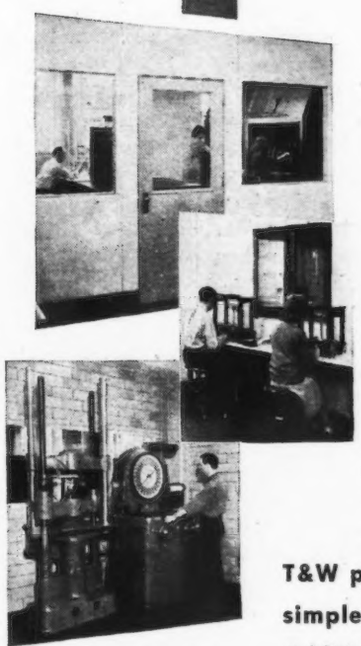
PRECISION CASTING

Sir:

I would appreciate a clipping of the article on "Precision Casting of Heat Treatable Copper-Base Alloys," which appeared in the issue of Sept. 19.

J. WAMPLER
Roots-Connersville Blower Corp.
Connersville, Ind.

T&W FORGINGS
USUALLY COST LESS AT THE *Point of Assembly*



Partial View of Chemical Laboratory
Determining Carbon Content of Steel
Tension and Compression Testing Machine

Any difference in the price of a specific lot of forgings as between two or more sources of supply may result, as it often does, in a wider spread in final cost at the point of assembly with the forgings that were *lowest in price* at the point of delivery being the *highest in cost at the point of assembly.*

Ask a T&W Forging Engineer for supporting evidence that T&W forgings usually cost less at the point of assembly.

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Industrial News Summary . .

- **Steel Output Picture Seen Gloomy**
- **Long Strike Would Be Serious Blow**
- **Use of Oxygen Seen Boon to Steel**

A PROLONGED tieup of the nation's coal mines would produce one of the most serious impacts on the steel industry in recent years and undo a substantial part of the progress made towards the establishment of a normal steel market. Having had its first chance in the past few months to step up steel output to unprecedented peacetime levels and thus greatly reduce the tremendous unfilled demand from customers, it appears this week that the industry is about to be plunged into the period of hectic hit-and-miss production schedules and shortages which followed the steel and coal strikes earlier this year.

Unless the coal crisis is passed quickly and a settlement reached there is the bitter possibility that the steed operating rate will not only sag to a much lower level, but will not regain current levels for 2 or 3 months, if then. The unusually high rate of activity has prevented steel firms from building up coal inventories, which are now at an exceedingly low point. Complete stoppage of work at the mine pits may within one week reduce the operating rate by 10 points to around 80 pct of capacity.

Should the coal impasse with its fundamental issues run into a long period, the industry within a few weeks time may find its ingot rate down around 65 or 70 pct. These severe setbacks would be brought about because of the necessity for banking blast furnaces which have been the main support for the currently high steel activity.

FAR more important and apt to be overlooked is the fact that, if the coal strike should last through December, many blast furnace operators might be forced to keep their units out of operation until the outcome of wage negotiations with the United Steelworkers of America is definitely known. To start up such units after a coal strike only to head into a steel strike is not good business and would probably result in the necessity for substantial subsequent repairs to blast furnace equipment. If this condition should come to pass, it is obvious that the steel ingot rate would suffer correspondingly.

The steel ingot rate this week continues to roll along at the peak level of 91.5 pct of rated capacity, unchanged from last week. Some revisions may be necessary later this week should the coal miners leave the pits on Wednesday night.

While the steel industry again faces the prospect of lower operations and maldistribution of its products because of labor difficulties, it was pausing this week to explore on its metallurgical front the possibility of a history-making advance in steel production through the use of oxygen in blast furnaces and openhearths. The use of oxygen in iron and steelmaking, first tested in Belgium in 1913, has suddenly become a process of such promise to the industry that experts predict its development may easily revolutionize the industry to an extent equaled only by the continuous mill.

The process is currently being tested at several steel company plants in this country and the use of oxygen in some openhearth furnaces on a test basis has increased output as much as 40 to 50 pct. While there are many difficulties to be overcome such as new type burners and a reduction in the cost of oxygen, high hopes are held that this rejuvenated approach to modern steelmaking may be a lifesaver to the industry over the next several years of high materials and labor costs.

ALTHOUGH major steel companies last week had still made no move toward increasing steel prices generally, steel consumers were taking some statements of steel officials with a grain of salt. According to steel consumer reaction, steel users fully expect higher steel prices if coal and steel wages are hiked.

Instead of base price increases representing the full import of price adjustments to be made soon, which will cover products on which it is claimed little or no profit is being made, part of these revisions may be carried out through adjustments in steel extras—charges covering chemical and physical characteristics which are added to the base prices.

Many small nonintegrated steel companies last week advanced their steel quotations, some by raising base prices and some by adjusting steel extras which resulted in an overall price increase. In practically all instances these increases were those which OPA had approved before steel price ceilings were removed but which had not been announced under OPA.

TO a certain extent confusion still reigned in iron and steel scrap centers as the market entered the second week of uncontrolled prices. Small increases in the price of heavy melting scrap at Philadelphia and Chicago were reported this week. At Pittsburgh considerable interest was being shown over the outcome of an important railroad list, bids on which were said to run as high as $30 a ton or more for railroad heavy melting. At midweek successful bidders and the disposition of the scrap were still uncertain.

To many scrap consumers the current prices are not a bar to the purchase of as much scrap as possible in order to build up depleted scrap stocks. Furthermore, some of today's current quotations are more realistic than those under OPA control and do not necessarily reflect as great an increase as statistics indicate when such factors as grades and quality are taken into consideration.

With price controls off, quotations on steel for export are on their way up. Some smaller mills whose output of ingots and semifinished steel is greater than that needed for their finishing operations are finding ready buyers abroad at prices substantially higher than in the domestic market. This trend is expected to continue.

• **PRICE AT TIME OF SHIPMENT**—The steel industry is expected to follow its wartime practice of quoting prices in effect at time of shipment. Most steel companies will not at this time revert to announcing prices on a quarterly basis as had been expected. This means that steel prices are now "subject to change without prior notice." The basis for such probable action is that steel firms insist that their costs are as uncertain as those of their customers. Eugene G. Grace, president, Bethlehem Steel Corp., and Benjamin F. Fairless, president, U. S. Steel Corp., while indicating that there will be no general price increase at this time or a runaway steel price market, have nevertheless made it plain that increased costs due to raw materials, coal labor and steel labor may subsequently force new quotations on steel products. Both also warn that adjustments will probably soon be made on low-return steel products. Some of this latter action is already taking place by revisions in certain steel extras.

• **1947 QUOTAS ANNOUNCED**—Now that much of the 1946 backlogs are canceled the new 1947 quotas were announced to the trade this week. New orders to the mills, with one exception, are being scheduled only through March of next year. Although in some cases orders have been accepted through June, anything past March is either not accepted or taken and held in the sales office as unentered but allocated tonnage. Uncertainty over next year's continued operations is one of the reasons for confining the tonnage actually entered to the first quarter. Because of the 45-day lead time needed on some products, the mills two weeks ago entered their various quota commitments on cold rolled, long ternes and tinplate for January shipment. Other products, needing only a 30-day lead time, are now being booked.

• **NONINTEGRATED STEEL MILLS**—During the current shortage of steel it can be expected that most small nonintegrated steelmakers will raise their prices a sufficient amount to cover what they claim to be substantial increases in material and labor costs. As long as steel demand far outstrips supply, these prices, which will probably be higher than those charged by some other companies in the larger groups, will be realized. When supply catches up with demand, however, past history has indicated that the smaller units have been forced to reduce their prices to the going quotations in the industry. The small nonintegrated mills are probably now in a greater squeeze than at any time in their history. They not only face higher wage costs in their own plants, but their raw material quotations on scrap and other basic materials are on their way up.

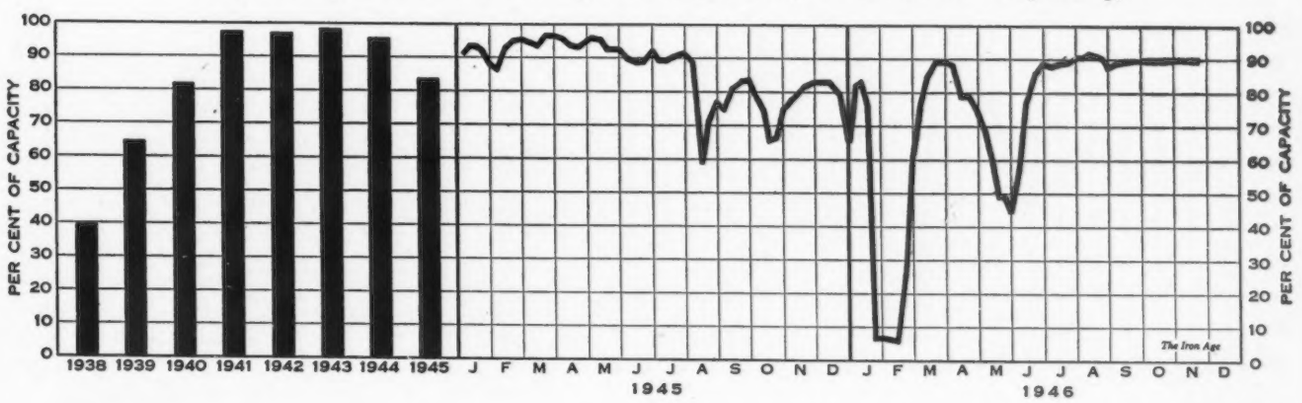
• **COAL STRIKE**—Should the miners go out on strike with the expiration of the union contract this week, steel operations in the western Pennsylvania and eastern Ohio area will be hit within a week. Coupled with the shutting down of blast furnaces, a fact that is inevitable should the strike occur, is the shortage of scrap that will make peak operations in steelmaking impossible. A 2-week supply of coal seems to be about the average for steel mills in this area, and this will be hoarded immediately to make it stretch.

• **STEEL DISTRIBUTION IN DANGER**—If the nation is tied up this week with a coal strike, it is a sure bet that the subsequent reduction in steel ingot output will upset all plans to put steel distribution back on a normal footing. Most steel companies have just completed the processing of old orders representing hundreds of thousands of tons of steel and have put them in shape to be in tune with current operating rates. A prolonged coal strike will upset such well-laid plans. Furthermore if the coal strike settles down to a long drawn-out bitter affair, steel production will be so endangered that low operating rates may carry into the period of steel wage negotiations. At the moment the optimistic outlook in the steel industry of a few weeks ago is under a total eclipse.

• **STEEL EXTRA CHANGES**—Several nonintegrated steelmakers have made changes either in steel extras for certain products or have advanced the base price on steel items. (See p. 103 for details.) Galvanized sheet makers this week are putting into effect an extra change setup which was approved by OPA before steel price controls were eliminated. Some steel firms will realize roughly about $7.50 a ton more under the new setup, $6.00 of which will be used up paying higher spelter prices. The additional $1.50 a ton is said to be needed to take care of increased manufacturing costs. The change in price will show up in the extras and not in the so-called f.o.b. base prices.

• **FORD STRIKE AVERTED**—Detroit Local 600 UAW-CIO has withdrawn from the strike notice the cases of the 18 openhearth workers who were disciplined, thereby minimizing the possibility of a work stoppage at Ford early in December. The cases of the openhearth workers will be processed through the grievance procedure up to and including the umpire. A meeting between the International Union and the management of the Ford Motor Co. will be held in the near future to discuss health and safety problems in the Ford plant.

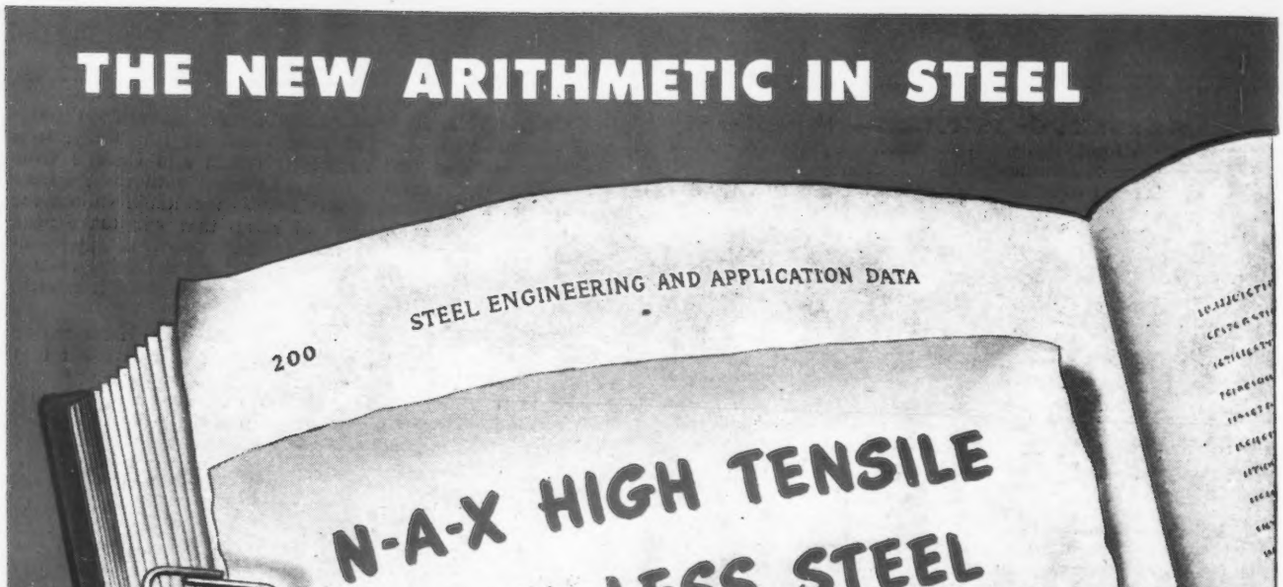
Steel Ingot Production by Districts and Per Cent of Capacity



Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
November 12...	99.0	94.5*	90.0	83.5	98.5	102.0	96.0	97.0	102.5	75.0	103.0	78.0	89.0	91.5
November 19...	99.0	93.5	88.0	85.5	91.5	102.0	96.0	97.0	102.5	78.0	99.0	78.0	89.0	91.5

* Revised.

THE NEW ARITHMETIC IN STEEL



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Small Steel Producers Announce Scattered Price Increases

Pittsburgh

By T. E. LLOYD
Pittsburgh Regional Editor

o o o

• • • **While the scramble** to hit a price level for various steel products is not ambitious nor as volcanic as that for finding a scrap price level, nevertheless the changes already made and contemplated should silence those who point to the steel industry as a horrible example of how steel prices are set by one company and followed by the others.

Within a week after OPA steel price controls were abolished, there were rumors of price increases on individual products by specific companies, despite the statement of B. F. Fairless, president, U. S. Steel Corp., that his company contemplated no general price increase even though specific prices would have to be adjusted and that the future course of prices depended upon costs. No price changes have yet been announced by the corporation or any of its subsidiaries.

Effective Nov. 12, Pittsburgh Steel Co. raised the prices on five of its oil country tubular specifications. H-40 casing was increased $14.50 a ton, J-55 casing was increased $9.00 a ton, and N-80 casing was increased $13.00 a ton. Oil well tubing, upset and non-upset, also came in for higher prices, when Pittsburgh Steel raised its H-40 grade $3.50 a ton and its N-80 grade $17.00 a ton. Actually, OPA had approved these price increases before its demise and greater price increases than were asked had been granted on one grade of casing. Because the full OPA approved increase would have thrown the grade into a price range higher than the next higher grade, the company did not charge the full increase.

Leading the field in adjusting prices of flat-rolled items was Continental Steel Co., Kokomo, Ind., which announced effective Nov. 15 an entirely new schedule on galvanized sheet gage and coating extras. This adjustment of extras is the schedule recommended by the industry to OPA some months ago, and it is reported that it had been approved by the OPA but not announced when OPA ceased. Apollo Steel Co. announced that it likewise had followed the same pattern in galvanized sheets. It is very likely that the remainder of the galvanized sheet industry will follow along quickly on these price adjustments.

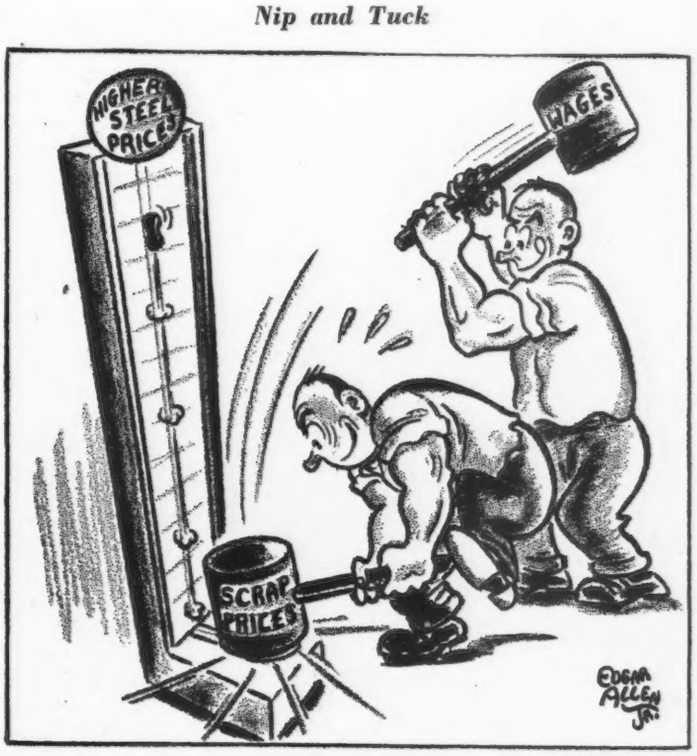
The schedule announced by Continental changes the gage upon which prices have heretofore been based from 24 gage to 10 gage. On the new gage extras, there is no price increase reflected on gages from 10 to 18, inclusive, and from gage 28 to gage 32. Prices did increase slightly, however, on the gages from 19 to 27. On the coating extras, the new charges reflect the 10¢ to 11¢ a lb zinc price, f.o.b. St. Louis, instead of the 5¢ a lb price upon which the coating extras have been heretofore based.

The coating extras are: 9 to 14 gage, 16¢ a cwt; 15 to 23 gage, 30¢ a cwt; 24 to 27 gage, 45¢ a cwt; and 28 to 32 gage, 60¢ a cwt. The new gage extras, based on 10 gage galvanized sheet at $3.55 a cwt, are: 11 gage, 5¢ a cwt with progressions in increments of 5¢ a cwt for each gage up to 15 gage, the price of which is $3.80 a cwt. For 16 gage there was no advance over the 15 gage price so it likewise is $3.80 a cwt. Then the extras advance 5¢ per gage again to 24 gage, making the 24 gage price $4.20 a cwt, instead of $4.05 a cwt which was the former base price. From 25 to 27 gage, the progression is in increments of 10¢ a cwt per gage, beginning at $4.30 a cwt for 25 gage; 26 gage, $4.40; and 27 gage, $4.50 a cwt. Gages 28 through 32 advanced 25¢ a cwt by gage, starting with 28 gage at $4.55 and ending with 32 gage at $5.55 a cwt.

Continental also announced an entire new schedule of extras on hot-rolled sheets, 19 gage and lighter, revising both width and gage extras and the extras on finishing.

Based on 19 gage the new price is $3.35 a cwt at regular basing points and $3.45 a cwt at Granite

Nip and Tuck



The Iron Age

City on hot-rolled, hot-rolled and pickled, hot-rolled pickled and oiled, and painted sheets and roofing products.

The extra changes on finishes included revised extras on dry pickling, oiling, lime finish and painting. For dry pickling, 19 and 20 gage carries a 30¢ a cwt extra; 21 and 22 gage, 35¢ a cwt; and 23 gage and lighter, 40¢ a cwt. The oiling extra on all gages 19 and lighter is 10¢ a cwt as is the lime finish on those gages. The painting extra for gages 19 to 24 is 30¢ per cwt and from 25 to 28 gage it is 35¢ a cwt.

Worth Steel Co. announced $3 a ton increase for other than flange quality tank plates on top of the $2 a ton premium that it had been charging, bringing Worth's price to $5 a ton over the published market price. Central Iron & Steel Co., Harrisburg, Pa., also raised its plate prices $5 a ton, in addition to the OPA-granted $6 premium. Other marginal plate producers were expected early this week to announce similar increases.

Copperweld Steel Co. on Nov. 13 announced a price increase to reflect the advance in copper prices for its copper clad wire. This increase amounted to about 6 pct on copper clad rods and wire, and slightly more on the company's output of stranded wire where, in addition to the clad wire, there is also some pure copper wire stranded into the product. The company reported that the price increase reflected only the increase in the cost of copper.

American Rolling Mill Co., Middletown, Ohio, came through on Nov. 18 with a revised set of extras on packaging sheets and strip. This is believed to be a move on the part of the company to increase the use of standard packaging.

Use of Oxygen in Furnaces May Revolutionize Steelmaking

Cleveland

By W. A. LLOYD
Cleveland Regional Editor

o o o

• • •**Use of oxygen** in openhearth and blast furnaces, first tested in Belgium in 1913, has suddenly become a process of such panacean promise and secrecy in the steel industry that experts predict its development may easily revolutionize the industry to an extent equalled only by the continuous mill.

While both Germany and Russia, among others, have experimented with the enrichment of blast furnace air in the interval since 1913, the process was brought into sharp focus recently by the Steel Co. of Canada, at Hamilton, Ont., where the most functional exploration of the process has been made thus far.

Results of tests conducted at Hamilton indicate that while use of oxygen in the openhearth holds great promise, the shortening of scrap melting time by at least 2½ hr requires that scrap charging be greatly accelerated to obtain the advantages of the use of oxygen. On the basis of these tests, it is believed that injecting oxygen into the molten metal bath will substantially lessen refining time and recent spot tests indicate an output increase of more than 40 pct in some cases.

Steel Co. of Canada at the present time can obtain only enough oxygen to run one openhearth on Saturdays and Sundays, but tests have shown an increase from 13.3 to 21.9 tons an hour.

South of the Canadian border, a number of American companies have been conducting extensive experiments with the process and it can be safely assumed that few, if any, major steel producers have been caught napping. Among the known leaders are Bethlehem Steel Co., Weirton Steel Co., Jones & Laughlin Steel Corp., Republic Steel Corp., and Carnegie-Illinois Steel Corp. American Rolling Mill Co., according to reports, will shortly begin tests at Middletown.

Bethlehem Steel Co. has been testing the precess at its Steelton Div., Steelton, Pa., where the melt time has been reduced from 12 to 6 hr, a gain of 50 pct. Bethlehem is now considering using the process in the blast furnaces, and will build an oxygen plant at its Johnstown plant, Johnstown, Pa., which will produce an estimated 129 tons of oxygen a day.

Weirton Steel Co. has had an oxygen plant constructed at Weirton, Pa., which according to reports, is not yet in operation, but the oxygen output will doubtless be for use in the openhearth and possibly the blast furnaces.

Jones & Laughlin Steel Corp. first tested the oxygen process at its Pittsburgh Works, where mixtures from pure oxygen down to pure air were used. Time reduction on the heats was considerable and it was then decided to test the process on a larger scale. Results of this were so interesting that it was decided to try the process on a long-term experimental basis at the Riverside plant in Cleveland.

Jones & Laughlin engineers took a furnace that was half-way through its run and planned to use oxygen mixtures until the run was completed. Following this, data were assembled and the whole experiment is now inactive. While it was rumored that Jones & Laughlin would build an oxygen plant here as soon as the new openhearth furnace, which will be rated at 169 tons a heat is completed, it is definitely known that no decision will be made on the general use of oxygen or the construction of an oxygen producing plant within a year or a year and a half. Though construction was approved by the board, it may be significant that the project has been suspended for further consideration.

Republic Steel Corp. is trying out the oxygen process in a number of openhearths in the Upper Cuyahoga Valley. According to reports Republic has been able to reduce the heat time 45 min in the openhearth. Experts from one of the large oxygen producing companies recently visited Republic's openhearth shop where oxygen was being used, and further testing is probably planned."

Carnegie-Illinois Steel Corp. has been experimenting with the process at Edgar Thompson Works, Braddock, Pa., and possibly at South Chicago, where an all-basic openhearth will be built shortly.

While the potential of the oxygen process is admittedly tremendous, there are a number of factors at least some major producers want to know more about, including the question of the purity of the oxygen. Also, existing burners are under suspicion and some experts think a new type burner

must be designed. Linde Air Products Co. has made some new burners which are now being tried on test runs at a pilot plant.

Use of oxygen also poses a scrap handling problem and, at the present time, a problem of scrap supply. When the process is employed. the furnace cannot be allowed to cool off, thus facilities for bringing up scrap in a short time must be available.

But cost of the oxygen is the major factor. While a captive oxygen producing plant can turn out oxygen for roughly one-third of the cost of the bottled product purchased independently, much depends on the oxygen producers who must tell the steel industry how much oxygen will cost on a large scale.

Although the steel industry has found that a furnace that can produce from 10 to 15 tons of steel an hr can be stepped up by the use of oxygen to 20 or 25 tons an hr, an increase of 40 to 60 pct, there is still the question of furnace life. The experts know that furnace life is shortened, but not by how much.

Thus the oxygen question becomes one of economics, with the cost of oxygen, cost of new type vs old type burners and cost of furnace maintenance heading the list of present intangibles. The steel industry can doubtless solve the mechanical problems, but the cost of oxygen is the big factor.

Martin J. Conway, steel industry consultant, Stacey-Dresser Engineering Co., Cleveland, stated at the recent AISE show here that following the tests of the oxygen process in Belgium in 1913, where an increase of 12 pct in pig iron production and a 3 pct reduction in coke consumption was reported with the blast enriched up to 20 pct oxygen, a furnace in Germany 20 yr later showed, with enrichment of up to 26 pct, a coke saving of 14 pct and an increase in output of 12 pct.

In 1936, the Russians, after 4 yr of tests, reportedly recorded the following possibilities for further investigation:

(1) Hot blast enriched by oxygen, proposed for the Makejevka furnace, using existing furnace plant and stoves. Oxygen concentration usually below 30 to 32 pct.

(2) Cold blast with more than 30 to 32 pct oxygen. Additional heat in the shaft to be provided by blowing heated gases into the shaft. Intensive hearth cooling would be required and injection of water vapor into the hearth suggested.

(3) Enrichment to 55 to 60 pct oxygen to give blast furnace gas suitable for ammonia production. Hearth temperature would have to be reduced.

(4) Radical decrease in coke consumption, cold blast and hot reducing gas to be introduced into the shaft.

(5) Direct steel process. Coke to be charged peripherally to reduce carburization.

Krug to Freeze Coal In Transit at Inland And Tidewater Ports

Washington

• • • **Faced with certain** reduction and possibly a stoppage of bituminous coal production, Solid Fuels Administrator J. A. Krug on Nov. 16, issued sweeping orders which froze coal in transit, at inland and tidewater ports, and in retail yards. The action also instituted a "rationing" system by restricting deliveries, in most cases, to consumer requirements for 10 days.

No requisitioning of coal from consumers who have more than they need over a protracted period is contemplated, the SFA said. A spokesman admitted, however, that in the event of a crisis such as a prolonged work stoppage at the mines, it might be necessary for some consumers to loan or trade coal for more critical needs on a "purely voluntary" basis.

The orders apply to operators of all bituminous mines to shippers of coal to Great Lakes and tidewater ports and to dealers and commercial dock operators.

Under the first order shippers are prohibited from releasing coal on track, in colliery yard, or at weigh scales at the mine until notified by the SFA. Working mines, however, may release such tonnages as necessary to permit continued operation.

A second order, prohibits shippers from releasing coal in transit, at lake or tidewater ports, or for delivery as bunker fuel. Each shipper must wire direct to the SFA information on the amount or number of cars, type and sizes of coal, names of producers and either the mine or its sales agents.

The final order prohibits deliveries except to certain classes of consumers who certify that they have less than 10 days' supply on hand. These consumers include public utilities, railroads, laundries, hospitals, food processing and refrigerating plants, vessels (for bunker or galley) and domestic consumers.

Included also are retailers who having themselves received certificates of need from consumers, must certify to their suppliers that their inventory is below 10 days' supply and the amount requested is needed to fill certified needs. No more than a 10-day supply may be delivered to a consumer at any time.

OPA Business Data Available to Industry

Washington

• • • **Business data,** collected by OPA during the past 4½ yr, is now being assembled and is available, upon request, to trade associations, publications, individual companies, research firms and others.

OPA's Records Branch will continue to function until June 30, 1947. The records will then be transferred to the National Archives as a part of the government's permanent files.

A partial inventory of the vast amount of statistical data accumulated by OPA has been completed and is available for inspection. The inventory thus far completed covers primarily National Office records of the Price, Accounting and Rationing Departments. A listing of statistical data in the Regional and District Offices is also underway.

First Half 1947 Steel Demand Estimated at 29 Million Tons

Washington

By GENE HARDY
Washington Bureau

o o o

• • • **American industry will require a minimum of 28,811,000 tons of carbon and alloy steel products and 4,242,000 tons of pig iron during the first half of 1947, according to a CPA study of iron and steel needs. The detailed requirements, presented exclusively by THE IRON AGE in the accompanying tables, represent a part of CPA's final effort to straighten out the nation's economy. The study is currently being expanded to cover the full year of 1947.**

Except for the requirements of the food and railroad and utility programs, demands for iron and steel are greater for the first half of 1947 than the final quarters of this year. Fourth quarter 1946 estimated requirements are also presented for comparative purposes.

The total steel requirements of 28,811,000 tons are 2,349,000 tons greater than last half 1946 estimated needs. Finished steel output is estimated at about 52,000,000 tons this year.

Broken down the first half 1947 steel requirements are as follows: food program, 2,219,000 tons; housing program, 2,173,000 tons; railroad and utility needs, including maintenance, repair and operating

Estimated Carbon and Alloy Steel Requirements

First Half 1947
(Thousand Net Tons)

	1947		Total First Half 1947	1946 4th Quarter
	1st Quarter	2nd Quarter		
Food Program, Total	1,072	1,147	2,219	1,076
Farm machinery	372	347	719	426
Food containers	700	800	1,500	650
Housing Program, Total	981	1,192	2,173	830
Housing structure	515	700	1,215	380
Plumbing, Total	105	113	218	103
Rain goods	30	30	60	30
Pressed steel bathtubs	1	1	2	1
Pressed steel sinks	8	8	16	8
Pressed steel lavatories	*	*	*	1
Water heaters and tanks	66	74	140	63
Coal-fired cast iron	*	*	*	*
Gas side arm	*	1	1+	1
Gas underfired	20	21	41	20
Oil underfired	4	4	8	3
Oil side arm	*	1	1+	1
Indirect (tankless coil)	14	15	29	14
Indirect instant	1	1	2	*
Indirect storage	*	*	*	*
Electric	4	4	8	3
Range boilers	13	15	28	12
Expansion tanks	1	1	2	1
Hot water storage tanks	9	11	20	8
Heating Equipment, Total	187	194	381	181
Cast iron radiation	2	2	4	2
Convector radiation	3	4	7	3
Warm air furnaces and access.	68	70	138	65
Stokers (residential only)	3	3	6	3
Oil Burners (residential only)	1	2	3	1
Heating stoves and circulating heaters	37	37	74	36
Cooking ranges	43	46	89	43
Boilers	10	10	20	9
Other heaters	5	5	10	4
Stove pipe and elbows	15	15	30	15
Electric Bldg. Matls. and Eqpt., Total	91	92	183	86
Outlet and switch boxes	12	13	25	10
"BX" and Romex cable connections, thin wall conduit fittings	3	3	6	2
Thin wall conduit (EMT) rigid conduit	63	63	126	63
"Current-Carrying" wiring devices	4	4	8	3
Residential lighting fixtures	9	9	18	8
Insect wire woven cloth	7	7	14	6
Builders hardware	40	40	80	35
Valves and fittings—housing	4	4	8	4
Utility expansion to aid housing program	32	42	74	35
Railroad and Public Utility, MRO, Total	1,312	1,327	2,639	1,317
RR MRO	314	314	628	314
Rails	600	600	1,200	600
Rail accessories	350	350	700	350
Utility MRO	48	63	111	53
Export, Total	1,700	1,700	3,400	1,700
Government supported	903	903	1,806	903
Other including Canada	797	797	1,594	797
Other, Total	8,791	9,589	18,380	8,365

	1947		Total First Half 1947	1946 4th Quarter
	1st Quarter	2nd Quarter		
Non-housing construction				
Structure—steel as such	720	1,040	1,760	646
Equipment—boilers, stokers, etc.	n.a.	n.a.	n.a.	n.a.
Maintenance	1,400	1,400	2,800	1,400
Mining machinery	23	23	46	23
Transportation				
Cars and locomotives	614	614	1,228	515
RR bridge and bldg. steel	20	20	40	20
Passenger automobiles	1,614	2,080	3,694	1,583
Trucks	552	652	1,204	513
Electric bldg. matls. and lighting Eqpt.-nonhousing				
Indus. and Commer. Lighting fixtures	29	29	58	29
Miscell. lighting eqpt.	32	35	67	28
Consumers durable	900	900	1,800	900
Washing machines	40	40	80	35
Refrigerators	115	115	230	110
Metal furniture	250	250	500	250
Other	495	495	990	505
Heating stoves, nonhousing	6	6	12	5
Tools	346	346	692	346
General industrial equipment	637	637	1,274	637
Service equipment	39	39	78	39
Construction machinery	119	117	236	117
Nonhousing valves and fittings	6	6	12	6
Production operations for crude oil, condensate and natural gas	400	400	800	400
Other containers	720	620	1,340	550
Military	114	125	239	108
Army	40	40	80	40
Navy	40	40	80	40
Arco	2	2	4	2
Maritime	32	43	75	26
Other, not elsewhere classified	500	500	1,000	500
Grand Total	13,856	14,955	28,811	13,288
Summary				
Food program	1,072	1,147	2,219	1,076
Housing program	981	1,192	2,173	830
RR and utility MRO	1,312	1,327	2,639	1,317
Export	1,700	1,700	3,400	1,700
Government supported	903	903	1,806	903
Other including Canada	797	797	1,594	797
Other requirements	8,791	9,589	18,380	8,365
Grand Total	13,856	14,955	28,811	13,288
Summary: Requirements as Pct of Total				
Food program	7.7	7.8	7.7	8.1
Housing program	7.1	8.0	7.5	6.2
RR and utility MRO	9.5	8.9	9.2	9.9
Export	12.3	11.4	11.8	12.8
Government supported	6.5	6.0	6.2	6.8
Other including Canada	5.8	5.4	5.6	6.0
Other requirements	63.4	64.1	63.8	63.0
Grand Total	100.0	100.0	100.0	100.0

* Less than 500 tons.

Pig Iron Requirements by End Items

First Half 1947
(Net Tons)

	1947		Total First Half 1947	1946 4th Quarter
	1st Quarter	2nd Quarter		
Gray Iron				
Soil pipe	153,000	153,000	306,000	153,000
Pressure pipe	144,400	144,400	288,800	128,900
Enameled sanitary ware				
Bathtubs	26,300	27,200	53,500	27,100
Lavatories	5,600	5,400	11,000	6,100
Sinks	13,200	13,800	27,000	13,300
Miscellaneous	6,500	6,500	13,000	6,300
Radiation				
Radiators	13,900	15,000	28,900	15,000
Convectors	300	300	600	300
Cast iron boilers	2,300	2,500	4,800	2,500
Warm air furnaces	37,800	39,600	77,400	38,900
Oil burners (residential)	900	900	1,800	900
Water heaters and range boilers	4,000	4,000	8,000	4,000
Ranges	18,000	20,600	38,600	19,500
Heating stoves	4,900	5,200	10,100	5,300
Fireplace equipment	1,500	1,500	3,000	1,100
Hardware (housing only)	3,100	3,100	6,200	2,500
Stokers (light type residential only)	1,800	1,800	3,600	2,000
Brake shoes	7,800	7,800	15,600	7,800
Agricultural machinery	17,500	17,500	35,000	18,900
Malleable Iron				
Agricultural machinery	15,000	15,000	30,000	15,000
Housing	33,800	33,800	67,600	33,800
Total "Must Programs"	511,600	518,900	1,030,500	502,200
All Other Programs*	1,609,400	1,602,100	3,211,500	1,618,800
Grand Total	2,121,000	2,121,000	4,242,000	2,121,000

* These requirements limited by the practical capacity of the foundries.

supplies, 2,639,000 tons; export, including government supported, 3,400,000 tons; all other requirements, which include the bulk of industry's needs, 18,380,000 tons.

In regard to pig iron, 1,030,500 tons are for the so-called "must" programs, including priority requirements for the housing programs.

The estimates gathered by CPA are based on a variety of factors. Primarily, they represent the views of the agency's various industry advisory committees. Priorities requests, data gathered during the period of reconversion planning and considerable WPB material also entered into the final analysis of the estimated requirements.

It should be made clear that these requirements represent only minimum production needs and do not cover additions to inventory. They are not indicative of unrestricted demand or what industry could actually accomplish in an economy completely free from all restraints, governmental as well as others. The estimates also assume increasing production throughout the year, with no recession during the first half.

Some of the estimates have already been stamped as conservative by CPA, particularly the nonhousing construction demands for structural steel of 1,760,000 tons and the 4,898,000 tons for the auto industry.

With CPA due to pass out of the picture on Mar. 31, 1947, if not sooner, the priorities requirements will undoubtedly undergo some change in their administration. Housing needs will, of course, revert to NHA. Priorities for other programs, such as export, will automatically die, unless Congress decides to extend some of the emergency powers of the Second War Powers Act beyond the March deadline, a not too likely development.

Flat-rolled products make up a considerable portion of the requirements shown in the attached tables. The housing needs reflect this demand, as shown by the following selected list of end products in plumbing items and the types of steel required to produce them:

Rain goods	Galvanized sheet for guttering downspouts
Pressed steel bathtubs	Deep drawing carbon sheets
Pressed steel sinks	Deep drawing carbon sheets
Pressed steel lavatories	Deep drawing carbon sheets
Water heaters and tanks	
Gas side arm	Sheet
Gas underfired	75 pct galvanized sheet, 25 pct other sheet
Oil underfired	93 pct galvanized sheet, 7 pct other sheet
Oil side arm	Sheet
Indirect (tankless coil)	Sheet and bar
Indirect instant	Sheet
Indirect storage	Sheet
Electric	83 pct galvanized sheet, 17 pct other sheet
Range boilers	Galvanized sheet
Expansion tanks	Galvanized sheet
Hot water storage tanks	50 pct galvanized sheet, 50 pct black sheet

Should NHA Boss Wilson W. Wyatt finally pull his prefabricated housing program out of the woods, sheets requirements will increase further.

The 183,000 tons needed for electrical building materials and equipment is composed of hot rolled sheet, 14 to 18 gage; cold rolled sheet, cold rolled strip, tubing and wire. About one third of this amount is tubing.

The requirements for consumer durable goods production are also heavily concentrated in sheet and strip, with metal furniture calling for almost 100 pct sheet and strip.

In general, CPA's estimates are predicated on the belief that demand for steel is far in excess of supply and will continue so during 1947. With the steel industry now operating at a high and reasonably stable rate of capacity the minimum demands for steel, based on consumer requirements, were relatively easy to determine.

CPA in its analysis of the steel situation says that the present supply problem is a result of the following factors:

(1) The tremendous losses in production during the steel mill shutdowns resulting from the steel and coal strikes. This tonnage is estimated at about 13,000,000 ingot tons or 9,000,000 product tons—the equivalent of approximately the total demand for consumer durable goods production in 1946 and more than enough to take care of the entire housing program.

(2) The general high level of industrial activity and deferred demand for consumer and producer durable goods. The supply situation is further complicated by the fact that demand is heaviest in light gage sheet and strip.

(3) The withdrawal of steel mills from certain products and from certain geographical areas. In both cases, this has been the result of

the relatively less profitable position of certain products, the additional cost involved in shipments to points outside the normal basing point areas and the general business decisions as to the position and demands of steel consumers judged from a long range viewpoint. The demise of OPA should eliminate the price factor involved in this problem.

(4) The general problem in steel is further complicated by the fact that CPA has recognized the existence of certain top priority programs and is granting special assistance to programs such as housing, minimum exports and certain other special programs such as freight cars. In the area of special assistance, particularly in regard to housing, the difficulties are most acute in sheet and strip, since the major housing type items of plumbing and heating equipment and prefabricated houses are extremely large consumers of sheet and strip.

Blaw-Knox Co. Bolsters Earnings from Reserves

Pittsburgh

• • • **Blaw-Knox Co.** reported earnings for the third quarter ending Sept. 30, 1946, of $688,741 and for 9 months of 1946 of $1,742,805. These compare with third quarter and 9 months earnings in 1945 of $632,473 and $2,065,191. Included in the earnings are transfers from reserves created in prior years for war and postwar adjustments of $450,000 for the third quarter and $1,350,000 for 9 months of 1946.

Shipments and billings amounted to $8,796,073 in the third quarter and were $35,997,797 for 9 months of 1946. For the corresponding 9-month period in 1945 shipments and billings amounted to $119,670,-624.

W. P. Witherow, president, reported that the 9-month earnings had been charged with $132,481 representing goodwill of Buflovak Northwest Co., whose assets and business were purchased as of Apr. 30, 1946. Results of the third quarter, he said, continued to reflect a shortage of materials, and the recent power strike had adversely affected shipments during the final days of September.

HPM Net at New High

Mount Gilead, Ohio

• • • **Best third quarter earnings in the history of Hydraulic Press Mfg. Co. have been reported by H. A. Toulmin, Jr., board chairman, showing net earnings of $206,487 on net sales of $2,267,113 for the quarter after provision for taxes and allowance for depreciation, and subject to year-end audit.**

For the third quarter of last year, the company showed a net loss of $9,598 on net sales of $1,105,493. Nine months' earnings for 1946 total $463,990 on $5,440,364 of net sales. This compares with nine months' earnings for 1945 of $3,353, on net sales of $2,669,207.

AMERICAN IRON AND STEEL INSTITUTE
CAPACITY, PRODUCTION AND SHIPMENTS

Period SEPTEMBER-1946

Steel Products	Number of companies	Items	Maximum Annual Potential Capacity Net Tons	Current Month: Production Net Tons	Current Month: Production Per cent of capacity	Current Month: Shipments (Net Tons) Total	Current Month: Shipments (Net Tons) To members of the industry for conversion into further finished products	To Date This Year: Production Net Tons	To Date This Year: Production Per cent of capacity	To Date This Year: Shipments (Net Tons) Total	To Date This Year: Shipments (Net Tons) To members of the industry for conversion into further finished products
Ingots, blooms, billets, tube rounds, sheet and tin bars, etc.	41	1	xxxx	xxxx	xxx	365,782	177,957	xxxx	xxx	2,601,393	1,198,424
Structural shapes (heavy)	12	2	9,421,550	355,261	48.8	347,144	xxxx	2,420,368	36.4	2,427,346	xxxx
Steel piling	4	3		22,200		20,739	xxxx	144,627		127,350	xxxx
Plates (sheared and universal)	29	4	17,080,770	415,352	29.6	417,492	20,288	3,056,338	23.9	3,034,021	197,464
Skelp	6	5	xxxx	xxxx	xxx	44,703	22,626	xxxx	xxx	293,721	135,805
Rails—Standard (over 60 lbs.)	4	6	3,657,000	187,255	62.4	186,692	xxxx	1,258,136	46.0	1,222,222	xxxx
—All other	5	7	392,000	13,886	43.1	12,536	xxxx	107,041	36.5	107,740	xxxx
Splice bars and tie plates	13	8	1,745,960	60,557	42.2	60,910	xxxx	448,218	34.3	472,199	xxxx
Track spikes	11	9	349,400	12,650	44.1	12,630	xxxx	98,587	37.7	103,626	xxxx
Hot Rolled Bars—Carbon	34	10	xxxx	646,917	xxx	524,403	72,390	* 4,901,070	xxx	* 3,994,413	503,383
—Reinforcing—New billet	15	11	xxxx	98,324	xxx	105,742	xxxx	684,217	xxx	745,072	xxxx
—Rerolled	12	12	xxxx	11,682	xxx	13,023	xxxx	101,116	xxx	102,815	xxxx
—Alloy	24	13	xxxx	181,571	xxx	157,672	12,002	* 1,237,617	xxx	* 1,037,305	92,794
—Total	41	14	22,326,160	938,494	51.2	800,840	84,392	* 6,924,020	41.5	* 5,877,605	596,177
Cold Finished Bars—Carbon	24	15	xxxx	120,227	xxx	120,021	xxxx	928,264	xxx	922,941	xxxx
—Alloy	23	16	xxxx	18,794	xxx	16,743	xxxx	159,855	xxx	142,577	xxxx
—Total	31	17	2,951,510	139,021	59.4	136,764	xxxx	1,088,119	51.0	1,065,518	xxxx
Tool steel bars	19	18	262,810	8,138	37.7	7,782	xxxx	* 74,972	38.1	* 72,246	xxxx
Pipe & Tubes—Butt weld	14	19	2,213,520	139,174	76.5	121,752	xxxx	1,002,097	60.5	943,106	xxxx
—Lap weld	9	20	730,200	23,682	39.3	24,565	xxxx	198,686	36.4	214,813	xxxx
—Electric weld	10	21	1,536,900	75,447	59.8	66,154	xxxx	552,831	48.1	474,490	xxxx
—Seamless	13	22	3,169,600	211,384	81.2	183,980	xxxx	1,569,541	66.2	1,380,699	xxxx
—Conduit (cap. & prod. incl. above)	6	23	xxxx	xxxx	xxx	9,837	xxxx	xxxx	xxx	67,786	xxxx
—Mech. tubing (cap. & prod. incl. above)	12	24	xxxx	xxxx	xxx	40,065	xxxx	xxxx	xxx	311,649	xxxx
Wire rods	26	25	7,293,670	412,640	68.9	98,593	30,685	3,141,157	57.6	745,427	255,781
Wire—Drawn	41	26	5,742,890	325,111	69.0	186,315	13,012	2,485,755	57.9	1,435,208	101,411
—Nails and staples	19	27	1,259,760	57,959	56.0	59,875	xxxx	423,284	44.9	423,879	xxxx
—Barbed and twisted	16	28	543,010	17,508	39.3	18,217	xxxx	152,271	37.5	150,979	xxxx
—Woven wire fence	16	29	1,121,060	33,734	36.7	35,063	xxxx	277,197	33.1	278,248	xxxx
—Bale ties	13	30	149,700	9,801	79.7	10,258	xxxx	65,716	58.7	68,971	xxxx
Black Plate—Ordinary	9	31	xxxx	xxxx	xxx	56,011	110	xxxx	xxx	530,965	1,277
—Chemically treated	8	32	465,000	6,937	18.2	7,570	xxxx	92,506	26.6	91,416	xxxx
Tin and Terne Plate—Hot dipped	9	33	3,758,850	167,981	54.4	169,349	xxxx	1,323,274	47.1	*1,413,375	xxxx
—Electrolytic	9	34	2,231,850	77,869	42.5	74,181	xxxx	646,282	38.7	655,040	xxxx
Sheets—Hot rolled	51	35	19,735,320	1,297,287	79.9	607,419	36,629	9,785,702	66.1	* 4,387,709	296,722
—Cold rolled	14	36	7,309,460	503,540	83.9	371,840	xxxx	3,907,721	71.5	* 2,820,756	xxxx
—Galvanized	16	37	2,924,130	119,118	49.6	133,378	xxxx	1,020,077	46.6	1,054,251	xxxx
Strip—Hot rolled	29	38	7,180,030	241,586	41.0	156,139	18,776	1,741,952	32.4	* 1,104,732	176,775
—Cold rolled	34	39	3,067,450	122,915	49.8	114,760	xxxx	949,238	41.4	* 920,101	xxxx
Wheels-(car, rolled steel)	5	40	315,400	22,132	85.5	22,970	xxxx	173,788	73.7	178,799	xxxx
Axles	6	41	398,170	12,198	37.3	11,419	xxxx	92,608	31.1	88,929	xxxx
All other	3	42	169,510	3,740	26.9	653	xxxx	31,913	25.2	4,233	xxxx
TOTAL STEEL PRODUCTS	143	43	xxxx	xxxx	xxx	4,994,377	404,475	xxxx	xxx	37,150,548	2,959,836
Effective steel finishing capacity	143	44	64,648,000	xxxx	xxx	xxxx	xxxx	xxxx	xxx	xxxx	xxxx
Percent of shipments to effective finishing capacity	143	45	xxxx	xxxx	xxx	66.-%	xxxx	xxxx	xxx	71.1%	xxxx

* Adjusted.

Weekly Gallup Polls . . .

Poll Shows Toledo Labor Plan Is Popular

Princeton, N. J.

• • • **With proposals** for control and regulation of labor unions being widely talked about as an aftermath of the election, one plan which would have wide public support is the Toledo citizens' committee plan, according to George Gallup, director, American Institute of Public Opinion.

In Toledo many labor disputes have been settled or averted by the efforts of a citizens' committee which has been made a department of the city government. Louisville recently organized a Labor-Management Committee, modeled on the Toledo Plan, with 18 members, 6 each from labor, management and the public.

These nonpunitive approaches to the present-day labor strife appeal not only to the general public but to members of labor unions as well. The general attitude is reflected in the following poll conducted from coast to coast by the institute on the general principle of citizen committee action.

"In Toledo, strikes have been settled by a local committee of citizens. Do you think that this method would work in your community?"

The national vote:

	Pct
Yes	52
No	23
No opinion	25

Here is how various occupation groups regard the proposal. while the no opinion vote is substantial, it is worth noting that among those who do express an opinion the vote of approval far outweighs the disapproval.

	Yes Pct	No Pct	No Opin. Pct
Prof. & Bus.	60	25	15
Farmers	52	13	35
White Collar	53	27	20
Manual Workers	49	24	27
Labor Union members	50	30	20

"Local people understand local conditions better than outsiders" —that is the chief reason given by voters in support of the Toledo Plan. Other typical comments on the poll:

"Local people should have a voice because they're the ones most affected and they would work for quicker settlement . . . Trying to get Washington to settle all labor disputes is foolish; they don't know as much about the problems as local people do . . . This would lead to more information on the good points of both sides."

Those opposed to the idea say: "There are too many factions in local communities . . . Many strikes are too big for local people to settle . . . Local politics might be involved . . . Unions are national organizations and too powerful to be dealt with on a local basis."

Whether labor strife is to be dealt with by citizens' committees, or by national legislation, or in some other manner, there is little doubt that the public wants action of some kind. For several years polls have found a rising trend of sentiment in favor of control and regulation of labor union practices. The trend has resulted from public irritation and disgust from strikes.

The extent to which the institute's polls on labor regulation have accurately reflected public thinking was demonstrated in the recent election.

Official referenda held in a number of states showed overwhelming public backing for labor control proposals. Propositions to ban the closed shop won substantial majorities in Nebraska, South Dakota and Arizona. In Massachusetts a proposal to require all labor unions to make public financial reports was carried by a 2 to 1 margin.

Plan for Citizens' Committee To Deal With Labor Strife Is Favored Throughout U.S.

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Strikes Cost Labor $1.5 Billion in Wages

New York

• • • **The direct loss** of earnings to labor due to strikes can be estimated on the basis of the first half year of 1946 at an annual rate of over $1½ billion, while a much larger sum has been lost indirectly through reduced production in industries supplying materials and parts to struck plants. This is the conclusion reached by Delafield & Delafield, New York investment advisers, who have recently analyzed the economic costs of strikes.

Pointing out that, in some cases, it will take years for the workers to recover, through wage increases, the direct loss in income incurred during a strike, the study states that higher prices resulting from strike-induced shortages reduce the purchasing power of every consumer's dollar, thus depressing the standard of living.

In examining the purposes for which wages are being spent, Delafield & Delafield report that wage earners spend a larger proportion of their earnings on current consumption than other major consuming groups. "Hence labor, in its role as consumer, is hurt most by the curtailment of output and the increases in prices caused by this year's unprecedented strike wave."

Magnesium Extras Up

New York

• • • **The Dow Chemical** Co. has increased quantity extras on extruded rods, bars and shapes effective Nov. 12. This increase has been made necessary by the increased costs involved in handling small orders. Magnesium prices were decontrolled in October 1944.

Postwar Holland Embarks On Industrial Recovery Plan

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By KARL RANNELLS
Washington Bureau

o o o

THE OLD AND THE NEW: *Perhaps the hardest hit of any invaded nation, tiny Holland is taking vigorous steps to regain her former position in industry and world trade. In this spirit is this shot of a DC-3 of the Royal Dutch Airlines over an old Dutch windmill.*

Washington

• • • **Holland, probably** the hardest hit of any invaded European nation, has embarked upon an intensive recovery program designed to regain, if not surpass, by 1951 the former place held in industry and world trade.

In effect, Holland is looking for world partners with whom to trade. Dutch prosperity before the war depended on intensive development of international trade and the 6-yr plan hinges on quick restoration of war-damaged industries and concentration on home production, Netherlands officials told THE IRON AGE.

"Five years of war destroyed our facilities for production and lowered the productivity of the laborer," a spokesman said. "Industrialization of Holland must be accelerated and labor productivity increased. If 1947 production is not increased substantially above the 1946 level, then the living standard of the country must be reduced."

The little nation is quite prepared to go all out in order to make the program a success. Exports have already been resumed on a modest scale, sometimes at the expense of the Dutch people who, like other nations, suffer many shortages. This is held necessary to help finance the purchases of capital goods from other countries.

Large imports are essential to the plan since they have a direct bearing on the two major obstacles hampering Dutch industrial recovery. One factor is the loss of factories, machinery and equipment; the other is the historical lack of raw materials. Holland produces coal, peat and some oil, but iron ore and all metals must be imported. The net result is that heavy imports of machinery, equipment and raw materials will mark the earlier stages of the rehabilitation program, officials say.

To this end, the Dutch government is prepared to make available for imports half the 3,000,000,000 guilders ($1.13 billion) marked for 1947 consumption. Next year will see the peak of import expenditures; however, by 1948, industrial production is expected to have increased so materially that imports will be tapering downward to meet the rising level of exports.

In part payment for these large imports, Holland will export goods amounting roughly to one billion guilders or $375 million. The remainder will be taken care of partly through some liquidation of Dutch assets, but largely through credits and loans from other nations. Holland's minister of finance recently visited the United States to arrange for loans of upwards of $500 million for the purpose. Three sources are open—the World Bank, the Export-Import Bank, and commercial money markets.

The Dutch have already done extensive borrowing in Great Britain, Canada and the United States for financing trade deficits through 1946. Despite the new borrowing through strict domestic monetary controls, Holland's budget deficit in 1947 is expected to be held down to less than $750 million with a balanced national budget in sight in 1948. Thereafter, attention would be directed toward orderly liquidation of foreign obligations.

One field in which Holland is determined to expand is the iron and steel industry; another is tin and still a third is aluminum. Historically, while the Netherlands is often regarded as an agricultural country, actually the limit of agricultural production had been reached in the middle thirties. In order to maintain employment, attention was turned to building up the industrial facilities which had been started at the close of World War I.

Construction of the first Dutch blast furnace was completed shortly after World War I. It was built at Ymuiden on the waterway leading to the port of Amsterdam. Ores were imported and other steps taken toward production of pig iron.

Later, a second furnace was built at Ymuiden and long before the outbreak of the second World War the Netherlands was producing not only all the pig iron needed for its own industries but was exporting substantial quantities, largely to Belgium and the Scandinavian nations. Some Dutch pig iron reached the United States where it was prized for its quality. During the immediate prewar period, Holland was the biggest European exporter of this product.

Foundries were constructed and

plans made and carried out for manufacture of steel slabs. A modern rolling mill was constructed at Ymuiden and the manufacture of thin plate instituted; plants at Utrecht began turning out steel and concrete reinforcing bars. Still later, another plant was built at Alblasserdam for the manufacture of rolling wire and steel strips.

By the outbreak of the war, Holland's rolling mills were producing 100,000 tons annually against domestic needs of 1,000,000 tons of steel products. Of the remaining requirements, more than half the total or nearly 500,000 tons were furnished by Germany. The present need, in view of the war's general devastation, has been conservatively estimated at 15 million tons or more.

Some of these industrial facilities have already been placed into operation again; as fast as materials and equipment can be obtained, others will reopen. End of the war found the Dutch metal industry shattered and transportation facilities virtually non-existent. All diesel and electric trains had been stolen; of the steam operated equipment, only 92 out of 1500 carriages and 144 out of 866 locomotives capable of being repaired remained.

The biggest rolling mill had been dismantled and shipped from Ymuiden into Germany, between 30,000 and 40,000 major items of machinery had been lost by looting, and additional quantities had been destroyed by air and artillery bombardment. One of the two Ymuiden blast furnaces and 52 of the 87 foundries had been demolished. The remaining furnace was badly damaged.

One blast furnace was blown up about the middle of October 1945. Its production is sufficient for present needs of Dutch steel mills and foundries. When the second was blown up on Oct. 1, 1946, production for export began. At the present time, all but seven of the foundries have been placed into operation once more.

Dutch planning for industrial development in the field of nonferrous metals indicates the same tendency toward concentration on home production as manifested in the steel and alloys field.

Before World War I, most of the tin ore mined in the Far East was smelted at Singapore and in the United Kingdom. In 1928, the Dutch constructed a tin smelter at Arnhem, enabling the Netherlands to produce its own tin as well as an appreciable amount for export from concentrates shipped from Bolivia and the Far East. This smelter was seriously damaged during the battle of Arnhem but was placed in operation in October 1946.

In addition, tin production is steadily increasing in the Dutch East Indies. Production on Bangka island is estimated at 2000 metric tons for 1946 while production on Billiton island has increased to about 450 tons monthly.

Manufacture of aluminum did not begin in Holland until shortly before the war when a rolling mill was constructed at Utrecht. This plant, also completely destroyed by the Germans, has been rebuilt since VE-Day and recently resumed operations.

Zinc slabs were formerly made by the Kempen Zinc Corp. in Budel which also had a zinc flatting mill for the manufacture of sheets from slabs. At the present time, however, the shortage of coal is forcing the importation of zinc slabs for rolling.

While no announcement has been made as to how the $1.13 billion for imports will be spent, presumably the expenditures in America will follow largely along the lines of 1946, the total of which is close to $350,000,000. Of this amount, about $250 million was allocated for industrial goods and materials and the remainder for food and other commodities.

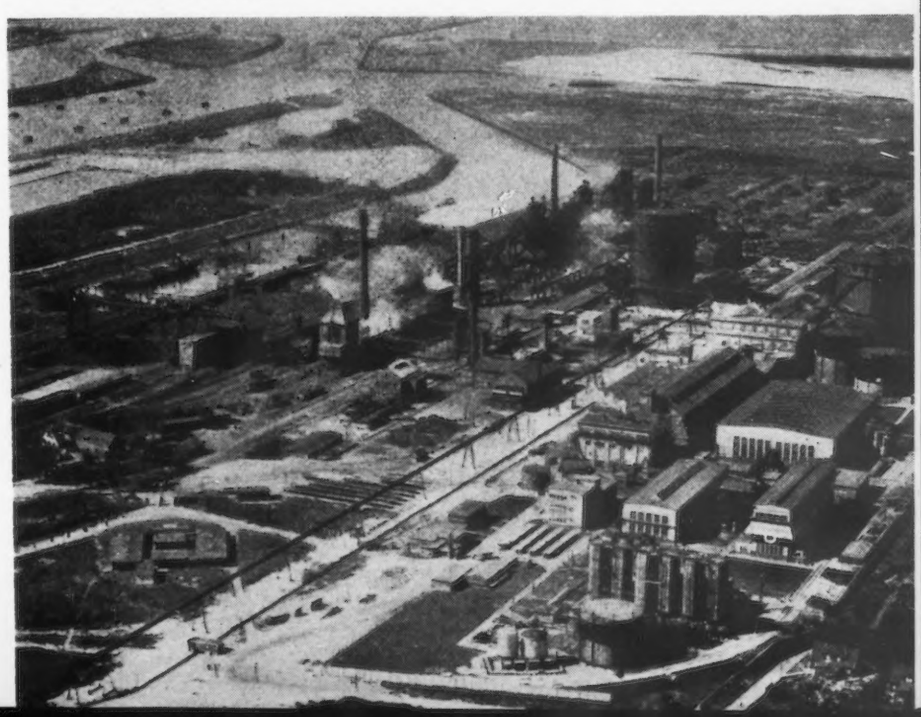
Dutch industrial purchases in this country during 1946 included around $20 million for iron and steel, $18 million for non-ferrous metals, and $52 million for metal end items of various kinds.

Any deviation from this pattern may be expected to lean more toward heavier purchases of production equipment. Machinery is the crying need of the Dutch at present and the demand may be expected to remain high for a period of from 3 to 5 yr. Industrial equipment and machinery were dismantled by the Germans and transported wholesale into the Reich.

As an example, the AKU — an affiliate of the American rayon industry — lost to the looters more than $6 million worth of textile machinery from its plants centered around Arnhem and Ede. In another instance, the invaders dismantled and removed from Holland an entire rolling mill. Only a small proportion of this equipment, machinery and machine tooling have been recovered in more than 1½ yr after liberation.

Farm machinery, too, is desperately needed in large quantities. Formerly, approximately 60 pct of Dutch needs was imported from Germany. Neither England nor the United States, however, will be in a position to supply requirements in this field for some time to come

PIG IRON SURPLUS: *A few months ago the second of the war-wrecked blast furnaces at this plant in Ymuiden on the Netherlands North Sea coast was blown in. It now gives the Dutch enough pig iron for domestic needs and provides some extra for export.*



and Dutch industrialists are turning their attention to domestic production of farm equipment.

While war-damaged industries are being restored, plans have already been put in motion to manufacture within the country many articles which were formerly obtained from industrial Germany. Among the products that will be strongly promoted are mechanical and optical instruments and the diamond and silver industries. Government aid will be granted for opening up approved new industries.

At present, due to the lack of equipment and raw materials, attention is to be concentrated on reviving handicrafts and stepping up manufacture of items requiring little or no critical raw materials. Despite the great progress made in industrial mechanization, at the outbreak of the war there were some 150,000 concerns of 10 employees or less, employing a total of more than 400,000 still engaged in hand manufacture. In anticipation of increasing industrialization the Dutch government is inventorying all manual crafts in order to be prepared to train and transfer such workers to jobs requiring mechanical skills as machinery and raw materials become available.

Says Russian Economy Leads the World In High Profit Margin

New York

• • • **Far from operating** "without profit," as is popularly supposed, Soviet Russia runs her socialist economy on the highest profit margin of any industrial country in the world, Peter F. Drucker, professor of economics, Bennington College, writes in the current issue of *Steelways*, published by the American Iron & Steel Institute.

"The profit in the Russian automobile industry," Mr. Drucker points out, "is three times as high as it is in Detroit." Russian economists admit it must be that way, he adds, for the risks in timing a planned economy are greater than those faced by business in a system where free trade and competitive prices quickly seek out the weak points in any enterprise.

Although the experts, whether they be Russian, American or Hottentot, agree upon the nature, function and importance of profit, there is no other subject upon which the American public is so misinformed, Mr. Drucker believes.

A poll taken by a prominent research organization indicates, for example, that most Americans believe that profit takes as much as 25 pct of the price paid for a service or product. Most people also believe that that share is about equal to the amount absorbed by wages.

Nothing could be farther from the truth, the writer states. In the average heavy industry, for example, the share taken by profit from the sale of goods and services is generally between 3 and 4 pct. Wages, on the other hand, average roughly in the neighborhood of 40 pct, in most cases, or at least ten times the share of profit.

These misunderstandings about profits explain, Mr. Drucker thinks, the seemingly widespread belief that wages can be substantially increased out of the "high profit margins" in American industry. Actually, there are no such margins to be cut into.

Military Transport

Washington

• • • **Addressing the Army Transportation Assn. in Chicago on Nov. 13, Secretary of War Robert P. Patterson made three forecasts regarding the character of military transport of the future: (1) Pressure for the most efficient means of transportation will be strong; (2) Changes in favor of speed and flexibility will make what we have now seem primitive; (3) Weapons and equipment will be of design and weight that will greatly facilitate their carriage, including carriage by air. This will be done by sectionalizing, by use of lighter metals and by new principles of propulsion that will radically reduce present requirements for mass and weight.**

Canadian Pig Iron Output Hit by Strikes At Basic Steel Firms

Toronto

• • • **Pig iron** production in Canada during September continued to reflect the slowdown in blast furnace operations caused by the strike at the three big basic steel companies. Output of pig iron in September registered a new monthly low at 45,078 net tons, compared with 135,227 tons in the corresponding month last year. Production included 31,900 tons of basic iron, all for further use of producing companies and 13,178 tons of malleable iron, all for sale. No foundry iron was made in the month.

For the first nine months of this year, pig iron output totaled 1,032,067 net tons, compared with 1,367,389 tons in the corresponding period of 1945 and 1,412,385 tons in 1944.

During September blast furnace charges included 82,727 tons of iron ore; 6068 tons of mill cinder, scale, sinter, etc., and 1440 tons of scrap iron and steel. At the end of the month five furnaces were in blast, three banked and six blown out. Of the five stacks blowing, three were located at the Hamilton works of the Steel Co. of Canada, and two at Canadian Furnace Co., Port Colborne, Ont. and Dominion Steel & Coal Co., reported three furnaces banked.

Production of ferroalloys in September registered a minor gain over the month immediately preceding at 6164 net tons, but was less than half the total of 13,517 tons made in September 1945. The month's output included ferrosilicon, silicomanganese, ferromanganese, chrom-x and ferrophosphorus. For the nine months ended Sept. 30, output of ferroalloys totaled 87,411 net tons as compared with 143,607 tons in the 1945 period and 182,428 tons in 1944.

Following are comparative monthly production totals for 1946 in net tons:

	Pig Iron	*Ferroalloys*
January	143,685	10,873
February	143,171	10,872
March	157,936	8,405
April	142,240	13,083
May	159,101	14,068
June	129,890	11,684
July	64,472	6,243
August	46,494	6,013
September	45,078	6,164
Total 9 Months	1,032,067	87,411

Largest Reciprocal Trade Agreement Reflects Tariff Cuts

Washington

• • • **The largest** reciprocal trade-agreement negotiation ever undertaken by the United States is scheduled to begin in April, 1947. As a preliminary to the discussions, the State Dept. has issued a list of thousands of items, ranging from playing cards to pipe organs and cheese to airplanes, on which the United States will consider tariff reductions. Public hearings will be held on these products before negotiations are begun.

The nations with which the negotiations are planned are Australia, Belgium, Brazil, Canada, Chile, China, Cuba, Czechoslovakia, France, India, Lebanon (Syro-Lebanese Customs Union), Luxemburg, Netherlands, New Zealand, Norway, Union of South Africa, Union of Soviet Socialist Republics and the United Kingdom.

In past years, the United States and the other countries participating in these organizations have accounted for about two thirds of the world's trade. The other negotiating countries have accounted for about the same proportion of United States exports and imports. The list of products on which pubic hearings are to be held is therefore extensive. It covers a large proportion of the important products in United States import trade, including some products of which Germany and Japan were formerly principal sources of United States imports, but of which the negotiating countries are likely to be the principal source under postwar conditions.

In the metalworking field, additional tariff reductions on many items could result from the negotiations. Under the extended Trade Agreements Act, tariffs that have been reduced 50 pct can now be reduced an additional 50 pct, making a net reduction of 75 pct. While there are only a limited number of items in this category the list includes a larger number of metals and metal products on which there have been reductions of less than 50 pct. Lowering of tariffs on this class of products will also be a subject of the negotiations.

At the same time that the State Dept. announced the forthcoming negotiations, the Committee for Reciprocity Information issued a notice fixing the dates for submission to it of written information and views about the negotiations and of applications to appear at public hearings before the Committee. All information and views in writing, and all applications for supplemental oral presentation of views must be submitted to the Committee not later than 12 o'clock noon, Saturday, Dec. 21.

These briefs should be addressed to "The Chairman, Committee for Reciprocity Information, Tariff Commission Building, Washington 25, D. C."

Public hearings will be held in the Dept. of Commerce Auditorium, beginning Jan. 13. Witnesses who make application to be heard will be advised regarding the time and place of their individual appearances.

Persons interested in export items may also present their views regarding any tariff or other concessions that might be requested of the foreign governments with which negotiations are being conducted.

The State Dept. says that it intends to include in the proposed trade agreements an adequate escape clause, along the lines of that appearing in the trade agreement with Mexico, under which a concession which, as a result of unforeseen circumstances, causes serious injury to domestic producers, can be modified or withdrawn.

The negotiations will be a two-way process, according to the State Dept. The United States will make requests for tariff and other concessions by the other countries in favor of a wide range of products covering a large proportion of our total export trade. Although no list of the export items on which concessions will be requested is to be published, the interdepartmental trade-agreements organization is preparing an extensive list of such requests, and export interests are urged to let the trade-agreements organization know at the public hearings what concessions they feel should be requested of the other countries involved in the negotiations.

Information is also requested about other trade barriers, such as quantitative restrictions or administrative regulations which have stood in the way of United States export trade with these countries, and as to any discriminations by these countries which have proved detrimental to United States exports.

Normal procedures followed under the Trade Agreements Act will continue to apply in the preparation for these negotiations. No tariff concession will be granted by the United States on any product not covered by the original list or a supplementary public list. Inclusion of any product in this list does not necessarily mean that a reduction or binding of any duty will be granted. No decision to offer a tariff concession will be made until after the public hearings, and the final decision as to what concessions will be granted will, of course, depend on the outcome of the negotiations. Concessions may take the form of reductions in duty (customs duties and import excise-taxes) or may simply bind existing duties or duty-free treatment or processing taxes.

The following classifications comprise the major items in metals and manufactures on which the United States will consider reductions in tariffs:

Iron and Steel Semi-manufac-

Cut Less Than 50 Pct

Washington

• • • A partial list of products on which rates have been cut less than 50 pct includes the following:

Pig iron; granular or sponge iron; ferromanganese, ferrosilicon, ferrochrome, ferrotitanium, ferrovanadium, and ferrouranium; chrome metal, boron carbide; muck bars; steel ingots, blooms, slabs, billets, bars, concrete reinforcing bars; boiler plate; steel sheet, beams, girders, joists, angles, channels, tees, columns and posts, sashes and frames, hoops and bands; wire rod; balls and bearings; axles and parts thereof; cast iron pipe; chain; steam boilers, and zinc.

tures: Pig iron; iron and steel scrap; hammer, roll and mill scale; steel bars; iron slabs, blooms and forms; bar iron (certain classes); wire rods (certain classes); sheets or plates; steel ingots, cogged ingots, blooms, slabs and billets; die blocks or blank; shapes, molds and castings, of steel; steel circular saw plates; tin plates and terneplates.

Steel Mill Products: Structural shapes, except sheet piling; rails; fishplates; and pipes and tubes, except tubes for ball or roller bearings; wire and manufactures (certain classes); hoop, band or scroll iron or steel, and bands or strips; nails, spikes, staples and tacks; castings and forgings; autoclaves, containers, drums and cylinders, not made by casting.

Iron and Steel Advanced Manufactures: Machine knives and blades; shovels, spades, scoops, drainage tools, forks, hoes, rakes; and certain miscellaneous tools; chains; bolts, nuts, rivets and screws; hinges, locks, and other builders' hardware; engraved plates, anchors, steel rolls, stoves and certain other advanced iron and steel manufactures.

Ferro-alloys, Ores, and Metals: Manganese: ore and alloys; chromium: ore, metal and certain alloys; ferro-silicon and calcium silicide; tungsten: ore, metal, alloys and compounds; spiegeleisen, beryl ore, titanium ore and certain other ferro-alloying ores, metals, and alloys.

Nonferrous Metals: Aluminum: bauxite; aluminum metal, scrap, alloys, mill products, and certain manufactures; copper: ore, concentrates, metal, scrap, mill products, and certain manufactures; brass and bronze: mill products and certain manufactures; nickel: ore, matte, oxide, metal, alloys, mill products, and manufactures; tin: ore, oxide, metal scrap and alloys; zinc: ore, metal, scrap, dross, mill products, and manufactures; antimony needle and metal; cobalt ore and metal; selenium; tin plate scrap; cadmium; and certain lead manufactures; magnesium: metal, scrap, alloys, powder, and mill products.

Machinery and Vehicles: Generators, transformers, converters, switches, sockets and motors; electrical appliances; engines and parts: turbines, other steam engines, locomotives and internal combustion engines; metalworking machinery and parts; textile machinery; cream separators and other centrifugal machines; printing machinery, linotype machines and bookbinding machinery; sawmill and woodworking machinery, and certain machines for making paper and pulp, and paper box machinery; food and tobacco preparing, packaging and manufacturing machinery; balls and rollers for bearings; other mining, construction, and industrial machinery.

It should be emphasized that the above listing covers only general classifications of products. For detailed product listings, including exemptions, industry should ask for the document entitled, "Products on Which Possible Tariff Concessions Will Be Considered in Reciprocal Trade Agreement Negotiations," which is available at the State Dept.

Cut 50 Pct

Washington

• • • **A partial listing of products on which rates have been cut 50 pct includes the following:**

Manganese ore; molybdenum ore; specified cast iron products; specialized machinery, such as textile and packaging machinery; internal combustion engines; cadmium; lead bearing ores; nickel tubes and tubing; molders' patterns; copper rolls, rods and sheets; and seamless brass tubes and tubing.

Canada's Steel Strike Results in Low Output Of Ingots and Castings

Toronto

• • • **Canada's production** of steel ingots and castings in September dropped to approximately 25 pct of rated capacity as a result of the steel strike. During the month output totaled 76,564 net tons and included 71,363 tons of steel ingots and 5201 tons of castings, compared with production in September 1945 of 198,508 tons. Charges to steel furnaces in September included 22,074 tons of pig iron, 19,422 tons of scrap of consumers own make, and 46,056 tons of purchased scrap.

For the 9 months ended Sept. 30 cumulative production of steel ingots and castings totaled 1,750,846 net tons as against 2,248,215 tons in the corresponding period of 1945, and 2,236,481 tons in the first 9 months of 1944.

Following are comparative monthly production totals in net tons:

1946	*Steel Ingots Castings*
January	244,623
February	233,893
March	249,117
April	247,519
May	259,626
June	214,861
July	135,914
August	88,729
September	76,564
Total	1,750,846

Coming Events

Nov. 22-23 American Zinc Institute, Galvanizers Committee, Chicago.

Dec. 2-4 Society of Automotive Engineers, air transport meeting, Chicago.

Dec. 2-7 National Power Show, New York.

Dec. 5-7 Electronic Microscope Society of America and American Society for X-ray & Electron Diffraction, joint meeting, Pittsburgh.

Dec. 5-7 Electric Furnace Steel Committee of Iron & Steel Div., American Institute of Mining & Metallurgical Engineers, annual conference, Pittsburgh.

Dec. 9-11 Society for Experimental Stress Analysis, New York.

Jan. 6-8 Institute of Scrap Iron & Steel, Inc., convention, New York.

Jan. 27-31 Electrical Engineering Exposition, New York.

Jan. 27-31 International Heating and Ventilating Exposition, Cleveland.

Jan. 28-Feb. 2 Society of Plastics Engineers, exhibition, Chicago.

Mar. 17 American Institute of Mining & Metallurgical Engineers, world conference on mineral resources, New York.

Mar. 22 Western Metal Conference and Exposition, American Society for Metals, San Francisco.

Apr. 29-May 1 Industrial Packaging and Materials Handling Exposition, Industrial Packaging Engineers Assn. of America, Chicago.

The London ECONOMIST

Veterans and the Government

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o o o

THE first hot blasts of a storm that may blow away a lot of the established traditions of relations between ex-servicemen and the government were felt recently in San Francisco. The scene was the first postwar convention of the powerful American Legion; the protagonists, Gen. Omar Bradley, head of the federal Veterans' Administration, and the leading officers of the Legion; the audience, delegates from the Legion's local posts, mostly older men, although 80 pct of the Legion's 3,300,000 members are veterans of the recent war.

The trouble started when the retiring Commander of the Legion, John Stelle, crudely charged the Veterans' Administration with breaking faith with the veteran. The specific grievance was an amendment which General Bradley got Congress to attach to the GI Bill of Rights in the last few days of its session. To avoid abuse of the on-the-job training program, by which apprenticeship wages are made up to a living wage by the government, a ceiling of $200 a month was put on the income of veterans making use of the scheme. But this was only a *casus belli*. In the year that General Bradley has been working a marvelous change, not only in the efficiency of the VA, but in its basic policy, it has become clear to the Legion that the good old days of the obliging General Hines are over and that the VA is no longer a widow's cruse which, with a little pressure, would give freely of government funds.

When General Bradley at San Francisco hit back at Commander Stelle in tones not usually heard from a guest speaker there were many people over the country who felt that he had at last taken the opportunity to come out openly against the increasingly obstructionist line which the Legion has been following.

The convention finally broke up in open opposition to government policy. The newly-elected Commander, Paul H. Griffith, promised to carry on the battle with General Bradley, and was roundly applauded when he pledged to get the repeal of the on-the-job ceiling. Among other resolutions, one was narrowly defeated for veterans' pensions of $50 a month at 50 and $65 a month at 60. (Another resolution urged the new Congress to remove the 5-yr redemption date on government bonds given to veterans under the Terminal Leave Pay Act, this in spite of Presidential warnings of the inflationary dangers of this amount of loose cash at the present time.)

THUS came to an end the first phase of postwar relations between veterans and the government. There have been other signs that a new pattern is gradually emerging but none has been so dramatic or so important. The first year, in fact, has been one of sorting out and handing out. The veteran has settled back into civilian life. As an individual, the vet by now is no longer a strange heroic figure but a fairly well-established part of the landscape. He is a taxidriver with "Veteran's Cab" painted on the door; he runs a cafe or filling-station and hangs "Veteran's Business" outside; in pay-queues or rush-hour buses he is indistinguishable from the rest save for a tarnishing discharge button in his lapel. He is only just starting to have a relationship with the government as part of a group and not as an individual.

During the past year, he has given the government a major administrative headache, simply to get him represented by a card in the files. There are 13½ million veterans from World War II as against 4 million others. Of American men between the ages of 18 and 35, about 63 pct have been in the forces. There has also been a lot more to do than just index them. "This year," according to General Bradley, "Congress voted more for the veteran than ever before in our history." Something like 4500 separate bills were passed which, one way or another, made work for the Veterans' Administration.

Until last summer, the Veterans' Administration gave no indication that it could cope with the headache. Between the wars, it had been a quiet bumbling backwater, suffering chronically from all the known occupational diseases of bureaucracy. As its annual budget rose in 1945 to $2 billion, there seemed little hope that it could brace its weak knees against the inevitable pushing and shoving—from Congress and elsewhere—for a share in the "pork" which it had to distribute.

This year, the VA budget is $4500 million; for 1947, there are plans, approved by Congress, for spending $6300 million. But when General Bradley, now being mentioned as a possible successor to General Eisenhower, took over, he soon made it clear, not only that he would make the VA reasonably efficient, but that he would not let it be used for horsetrading either with Congress or the veterans' organizations. His recent refusal to allocate new veterans' hospitals on any grounds other than medical ones is a case in point.

Perhaps fortunately for the convalescent reputation of the VA, its responsibility stops short of

[CONTINUED ON PAGE 159]

State Dept. Report Shows Overseas Surplus 85 Pct Sold

Washington

• • • **Disposal negotiations** have been completed for 85 pct of declared overseas surplus, according to a State Dept. report to Congress which summarizes operations of the Foreign Liquidation Commission through the third quarter of 1946. These disposals represent roughly two-thirds of the total estimated surplus abroad.

Total estimated overseas surplus is about $10 billion, of which approximately $2.5 billion remains to be declared, the report shows. Of the $7,584 million worth made available, disposals have been made of $6,475 million (original cost) which netted the government a return of $1,495 million.

Some $427 million worth of the total represented property which was deemed unsalable, another $84 million was donated to charitable, religious and educational institutions, and $142 millions transferred to UNRRA as part of this nation's contribution to that agency's activities. The remainder was disposed of through regular channels for cash, credit or their equivalent.

Large bulk sales were made to France ($1.4 billion), United Kingdom ($351 million), Italy ($565 million), China ($600 million) and the Philippine Government ($400 million).

In Europe, Africa and the Middle East, the report said, disposal has been made of 94 pct of the total declarations with the United Kingdom and northwest Europe the largest buyers. China and the newly established Philippine Government were the biggest customers in the Pacific area, most of which involves intricate dollar credits and manipulation.

Under the agreement with the Philippines, the United States will turn over to the island government installations and materials having an original cost of $638 million for a net return of about $137 million. As a consideration for this deal, the Philippine Government agreed to release the United States from $32 million worth of its total $57 million obligation incurred through issuance of emergency currency.

All surpluses in the Netherlands Indies, amounting to a total of $62 million, have been sold to the Netherlands, Australia and UNRRA for a recovery of $18 million.

For the first time, the report revealed a general idea of the types of property left surplus. Motor vehicles, having an original cost of more than $1 billion, headed the list as of July 31. Maritime bases and property ranked second with a valuation of $770 million.

As of the same date, other categories included $70 million worth of iron and steel, $193 million worth of industrial machinery and equipment, $140 million in fabricated metal products and $78 million in miscellaneous metal products.

OVERSEAS SURPLUS CLASSIFICATION

(Cumulative through July 1946)
To Nearest Thousand Dollars

Classification	Original Cost
Motor vehicles	$1,037,839
Maritime property	770,772
Aircraft	729,997
Fixed installations	562,945
Ordnance	340,448
Communications equipment	326,341
Industrial machinery & equipment	193,233
Fabricated metal products	140,813
Railroad equipment	155,159
Miscellaneous metal products	78,339
Technical & scientific apparatus	77,493
Tractors	90,560
Construction and mining equipment	90,526
Electrical machinery and equipment	128,107
Coal and petroleum products	39,314
Rubber products	40,460
Chemicals	75,144
Iron and steel	69,111
Other metals, minerals	23,846
All other, including food and textiles, miscellaneous	835,080
Total	$5,806,032

Because of a lag in reporting surplus declarations by commodity and the exclusion of certain bulk sales which had not been declared surplus as of July, a difference of about $1,175 million is noted in the above table and the total of $6,980 million surplus declarations reported at the end of the third quarter 1946.

OVERSEAS SURPLUS OPERATIONS

Cumulative through Sept. 30, 1946
In Thousands of Dollars

Area	Declarations (Cost)	Sales (Cost)	Received
United Kingdom and NW Europe	$2,475,353	$2,366,812	$534,211
Italy and Mediterranian	661,133	595,446	179,985
Africa - Middle East	105,823	87,284	35,203
Persian Gulf	72,293	72,293	24,867
Pacific and China	2,535,686	1,756,299	442,623
India-Burma	683,154	683,154	72,216
Canada-North Atlantic	333,525	251,236	93,390
Latin America	69,104	27,993	9,694
Military Services	29,760	17,123	549
Total	$6,980,926	$5,871,318	$1,400,434

The declarations represent property made available for sale to the FLC and do not include transfers to UNRRA, donations or abandonments. Disposal figures are for completed sales and do not include pending negotiations. All figures are based on reports cabled to the State Dept. from overseas field offices and are subject to revision.

WAA to Open Bids On Three War Plants

Chicago

• • • **Bids for the** purchase or lease of three war plants, two in Indiana and one in Wisconsin, will be opened the latter part of November and early December here. The Fall Creek ordnance plant which had the second largest armor plate capacity for tanks, is again up for bidding as previous proposals were rejected.

The other Indiana war plant previously offered, located at Anderson, was formerly operated by GMC, Chevrolet Div., as an aluminum forging plant to produce cylinder heads.

The third plant at Milwaukee, which was operated during the war by A. O. Smith Corp., was the eleventh largest aircraft parts producing plant in operation during the war. The plant cost the government $2 million and has a floor space of 405,000 sq ft.

Details Disposal Of U. S. War Items In European Theatre

GOING FAST: *Surplus U. S. war stocks are being sold at a fast rate in the European Theater. About 90 pct of material declared surplus in that area has been disposed of.*

Paris

• • • Surplus U. S. war stocks with an estimated original cost to American taxpayers of $3 billion have now been sold or otherwise committed in Europe, the United Kingdom, North Africa, and the Azores, according to the local office of the Foreign Liquidation Commissioner. Disposals of surplus to date account for approximately 90 pct of all stocks declared by the armed forces in the European area.

The recent commitment to the Belgian Government, under the lend-lease and surplus property settlement of remaining surplus stocks in Belgium on a 50-50 resale basis, climaxed a series of bulk agreements which has accounted for the major part of surplus disposals in Europe. Prior to this commitment, OFLC staged an intensive "over-the-counter" sales campaign at all Army depots in Belgium in September when buyers from all parts of Europe, the United Kingdom, South America and the Near East purchased surplus stocks for a total sales price of $52 million.

The Belgian Government under its agreement will now take over for resale stocks of all types and conditions estimated at more than $300 million at original cost to the American taxpayer. They are now preparing their plans to sell these stocks and will bear all selling costs.

Practically all U.S. surplus goods in the liberated areas have been sold or committed.

The bulk of remaining surplus material to be sold will come from U. S. depots in Germany where inventorying is still in progress. OFLC is preparing plans now to effect clearance for buyers to go to the occupied zone, and to arrange for the delivery of surplus purchases at selected points along the German frontier.

Eventual return from the surplus stocks already sold or committed in Europe may well be in the neighborhood of $1 billion, officials expect. The bulk agreements with France, England and Italy, which were concluded after months of negotiations, will cover surplus stocks with an approximate original cost of $2.5 billion, for which the U. S. Government will receive $520 million. The bulk agreement with France, involving the transfer of approximately $1.4 billion worth of surplus for $300 million, constituted the largest single transaction in the European surplus disposal program.

Commenting on the bulk transactions, P. H. Bonner, central OFLC field commissioner for Europe, pointed out that the transfer of surplus stocks under these agreements has made it possible for thousands of American troops to be released from custodial duties. At the same time, the bulk transfers have allowed the various governments to take possession of urgently needed materials before deterioration and pilferage take their toll. The bulk deals also include materials of all types and conditions, whereas in direct sales only the "cream" items are usually selected.

Although the great volume of war surplus in Europe has been liquidated through the bulk transfer, Mr. Bonner pointed out that during the past year the Office of the Foreign Liquidation Commissioner in the European Theater has:

(1) Furnished UNRRA with surplus stocks with an original cost of more than $114 million, including supplies of all kinds to provide the springboard for its overall European relief program. These stocks, ranging from locomotives to knives and forks, are being distributed throughout Europe in rehabilitation work, and for the most part will be credited to the U. S. contribution to UNRRA's funds.

(2) Funneled surplus supplies, material and machinery with an original cost of almost $150 million into the reviving economies of 17 European countries through purchases by the various governments on long-term credit agreements.

(3) Supplied the needs of 58 U. S.-supported charitable organizations engaged in relief work in Europe with surplus Army clothing, hospital equipment, medical supplies, lorries and thousands of other items originally costing $10 million.

(4) Sold $20 million worth of surplus items of all types to U. S. Government agencies, the U. S. Army Exchange Service, U. S. veterans and servicemen.

(5) Sold $36 million worth of surplus to individuals, other than U. S. veterans and servicemen, including exporters in Europe and the United States, South America and the Near East.

In addition to the bulk agreement with Italy in the Mediterranean Theater, OFLC has disposed of surplus stocks with an original cost of approximately $73 million, for a return to the American taxpayer of $46 million. UNRRA's procurement by transfers and direct purchases accounts for more than half of these disposals.

Practically every section of Europe's economy has felt the effects

of American surplus items now being channeled into its rehabilitation and recovery efforts. One of the outstanding achievements in the surplus disposal operation has been the reestablishment of European air networks principally with surplus American transport planes which were used during the war to ferry Allied troops and supplies in dozens of airborne operations.

The predominance at European airports today of Skymasters, C-47's, and other familiar transport planes, now carrying the colors of more than a dozen overseas airlines, reflects surplus aircraft sales in Europe, which now total 2258 planes of all types. Surplus planes sold in Europe account for well over half of OFLC's aircraft disposal throughout the world.

France, England and Italy, are three of the important beneficiaries of American surplus in Europe. France's economy is now receiving a healthy transfusion of supplies as the physical transfer of surplus stocks progresses under the terms of the bulk agreement. Already more than 100 depots and installations in France are in the hands of the French Government.

Under the agreement France is getting complete Army installations, port and harbor facilities built and improved by the Army and Navy, huge stockpiles of engineer construction equipment, machinery, trucks, tools, medical supplies and vast quantities of consumer goods. Practically all stocks purchased by France are expected to be in the hands of the French Government by Jan. 1, 1947.

American surplus materials acquired by France will be sold to the French under the "Societe Nationale de Vente des Surplus." Officials of the organization have indicated that several months may be required before the major part of the stocks reach the ultimate user, due to the necessity for detailed inventory, classification and cataloging.

The physical turnover of all stocks purchased by England is virtually complete, while transfers to Italy under the bulk agreement are in the initial stages. The British bulk deal, the first one negotiated, gave Great Britain remaining surplus materials in England, except certain quantities of aircraft and maritime equipment, for $60 million; while the Italian Government is receiving the bulk of American surplus stocks in Italy for $160 million.

All of the bulk agreements were financed under long-term dollar credits extending over periods ranging from 29 to 55 yr, payable with interest in annual installments. The bulk sales of surplus property to France, England and Belgium were part of the overall financial settlements of all accounts, including lend-lease, arising out of the war.

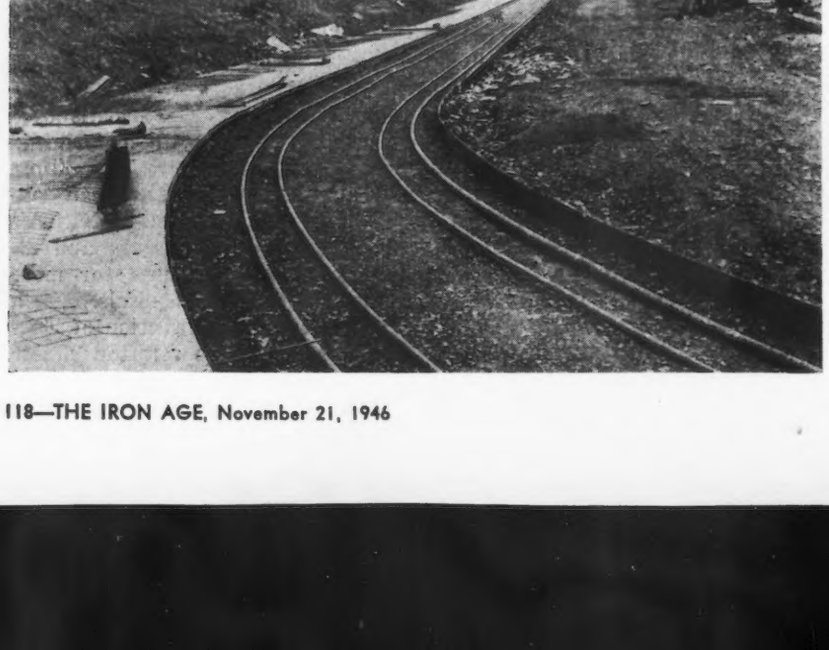
The reconstruction efforts of Holland, Finland, Belgium, Poland and Greece are being materially aided by the constant flow of U. S. surplus stocks into their economies. The Dutch Government has completed contracts totaling nearly $20 million for surplus supplies, including motor vehicles, engineer construction machinery, barges, generators, diving equipment, tools and quartermaster items. The KLM Airlines of Holland have reestablished a major part of their transoceanic service to Batavia with surplus C-54 transports.

American surplus materials of every description have been streaming into Finland for the past 7 months from U. S. depots in France, Belgium, Norway and Germany. The Finns have now completed contracts for surplus property totaling more than $14 million. Finland's purchases, according to William Lehtinen, chairman of the Finnish delegation in Paris, have provided his country with its most urgently needed postwar economic necessities and constitutes the first American products to reach Finland in 6 yr.

Belgium had already acquired stocks with an original cost of $30 million for $23 million prior to the bulk agreement, and Poland has bought surplus materials originally costing nearly $40 million for $25 million. Greece, whose line of credit was recently extended to $45 million, is now buying textile products, road and railway construction equipment, clothing, shoes, steel metals, cable and pharmaceutical products. At least a dozen other European countries are also sharing in the widespread sale of Army and Navy supplies and equipment left over from the war.

Sales to most foreign governernments in the European and North African area have been financed through credits granted by the U. S. Government which were arranged when it became apparent in the early days of the disposal program that the scarcity of dollars would be a major obstacle to the rapid sale and distribution of surplus stocks. Credits ranging from $1 million to $50 million were set up for Austria, Ethiopia, Finland, Greece, Hungary, Lebanon, the Netherlands, Norway, Poland, Saudi Arabia, Turkey, Brazil and China, whose governments have made purchases from European and North African surplus stocks.

HOT CORNER: *Sloping downhill and around corners, this roadway was a winter driving hazard at the Bridgeville, Pa., plant of American Cyanamid Co. This winter the 600-ft driveway will be skid proof because wrougt iron steam pipes are being installed in the pavement to melt snow and prevent ice formation.*



French 5-Yr. Plan Includes Steel Equipment Modernization

Paris

By JACK R. HIGHT
European Editor

• • • **As predicted previously,** the 5-yr plan for French industry calls for 70 billions of francs ($583,000,000) to be spent on the steel industry, primarily to be used for modernization rather than the expansion of capacity. The broad outlines of the national plan for all of French industry proposes a total investment of 2000 billions of francs ($16,600 million), approximately 1000 billion francs for industrial and gricultural equipment, and 1000 billion for public works. The other main items are: 180 to 200 billion francs for power development, 146 billion for the coal industry, 70 billion for the steel industry, 150 billion for farm equipment.

It has been pointed out that while the plan will have as its object the development of the capacity of production of the steel industry (estimated at 13 million tons at present, with 16 million tons as the objective in five years), the more important factor is to secure the necessary saving of coal and manpower.

As far as the blast furnaces and coking plants are concerned, the main point is the increase of capacity of coking plants in order to increase the coke output in France, which until now has depended heavily on foreign supplies. But the dependence for coking coal will remain, though perhaps lessened to a certain extent by the efforts to use coal from the Saar. Twenty-four modern blast furnaces will be built to replace certain old units of less than 300 tons per day capacity. New blast furnaces will have a capacity of 660 tons on an average. Some new ore preparation plants will be built.

For steelworks an effort will be made to concentrate production in order to develop units of at least 1 million tons capacity. For specialized steelworks the capacity will be lower. It is proposed to build two new basic bessemer converters and eight openhearth furnaces. New basic bessemer converter will have a capacity of 55 tons and openhearth furnace of 88 tons.

The essential part of the strip mill program contemplated, as previously reported, is for the erection of two hot strip mills, one in the north at Denain and one in the east at Thionville, or Hayange, or Hagonlange, the site not yet having been chosen. It is said that the strip mills will have a capacity of about 660,000 to 880,000 tons a year each. Two cold reduction mills and one tinplate mill will complete the plans. Three power stations of a total capacity of 380,000 kw a year will be built for common use, and four works power stations of 90,000 kw a year. Five thousand new workers 'houses are also contemplated.

From this first official information given about the plan, the main impression gained is that outside the strip mill program the rest of the equipment represents roughly the normal modernization of an industry which for more than 10 yr operated much under its capacity, and which may in the future be exposed to the competition of other producers which during the war had perhaps increased their capacity above the needs of their market in normal times.

The essential idea is to use the existing capacity first. There is a broad margin between the rate of production of about 4 to 5 million tons at present and the potential capacity of 13 million tons which could be achieved with sufficient coal supply. If Germany was not expected to keep a substantial level of production, as the recent discussion in Berlin seems to prove, some increase of capacity could perhaps have been suggested.

However, when the concentration and modernization plan has been achieved, it will contribute substantially toward increasing the finishing capacity of the French iron and steel industry, and from this point of view it will consequently have a substantially increased tonnage of finished products, especially sheets, available for the home market or for export.

It seems probably that a decision will soon be made regarding the strip mill plan in the north at Denain. An extraordinary meeting of the Denain and Anzin steelworks will meet on Nov. 16 to consider increasing the capital from 195,780,000 francs ($1,631,000) to 587,240,000 francs ($4,894,000) by the incorporation of reserves and the issue of new shares.

The North and East steelworks, with their main works at Valenciennes, also contemplated increasing its capital, and the matter will be put before an extraordinary meeting of the company on Nov. 14. These financial operations are closely connected with the concentration and modernization plan of the two companies, which will perhaps determine the form of association they could arrive at in order to secure their common program.

The results of the election which took place on Sunday (Nov. 10) will also give to France a new government to which the French five-year plan will be submitted for ultimate decision. Then the important question of foreign credit will have to be settled, as the main part of the equipment, particularly for the strip mills, has to be purchased in the United States so that the plans may be executed without undue delay.

It can therefore be said that at the present time the plan is ready and that certain preparatory work has already been started, and it remains to be seen whether the new government will approve it or express new ideas for the plan.

Pacific Tube Output Same

Washington

• • • **In announcing** the sale of an aircraft steel tubing plant in East Los Angeles, Calif., to the Pacific Tube Co., wartime operator of the plant, WAA said that the company plans to continue in the production of steel tubing. The company's present employment of 230, it was stated, will be increased to 350 upon completion of certain manufacturing alterations. The plant was sold for $1,525,000 cash.

Industrial Briefs...

• MEMPHIS OFFICE — Granite City Steel Co. announced the opening of a new sales office at Memphis. Howard J. Poland, formerly assistant to the general manager of sales at Granite City, Ill., will be the new district manager for the Memphis territory, which comprises the states of Arkansas, Tennessee, Louisiana and Mississippi.

• NEW FACTORY — C. P. A. approval has been given to the Jas. P. Marsh Corp. to start immediate construction of a new factory and office building, according to the company. The new building will be erected on a 5-acre tract of land located at Howard St. and St. Louis Ave., in Skokie, Ill.

• SELLS PARTNERSHIP — Earle P. Turner, Toms River, N. J., builder and manager of The Reade Co., Lakehurst, N. J., producers of metal powders has sold his partnership interest in this company to Charles H. and Leonard J. Reade.

• TO EXPAND — Puget Sound Sheet Metal Works, Seattle, is planning an expansion program involving an unnamed sum of money which will include the purchase of the four-acre tract of land across from its present location and the erection of additional facilities for the fabricating of sheet metal, structural steel and steel plate.

• OPENS ATLANTA OFFICE — Lebanon Steel Foundry, Lebanon, Pa., has opened a new sales engineering office in Atlanta. John H. Boyd, formerly of Richmond, Va., has been placed in charge of the office which is located at 17 Edgewood Ave., Northeast.

• DIRECT SALES OFFICE — The Riley Stoker Corp. has announced the reestablishment of a direct sales engineering office in the Pittsburgh territory. The new Riley office will be located in the Park Bldg, and will be in charge of Charles S. Allen, Jr.

• HARVESTER BUYS — International Harvester Co. with headquarters in Chicago, has purchased the Moore Equipment Co. factory in Stockton, Calif., for the production of farm equipment especially adapted to western conditions. Acquisition of this plant gives the International operations in three sections of California: a heavy duty truck factory at Emeryville and a farm machinery producing plant at Huntington Park.

• FERROALLOYS PRODUCER—The Chromium Mining & Smelting Corp., Ltd., of Sault Ste. Marie and Montreal, Canada, is planning the production of exothermic alloys in the Chicago area. This company will construct a steel building of about 1000 sq ft in area and will be served by two major railroads.

• FIRE LOSS—The Birmingham plant of the Rail Joint Reforming Co., which processed premade railroad track clips to harden them, was burned out recently and company officials estimated damage from the fire at between $50,000 and $60,000. The management said the plant probably would be rebuilt as soon as materials and equipment became available.

• NEW NAMES — David Brown & Sons (Huddersfield) Ltd., London, have announced that three of their several engineering companies are to be known in future under new names. The firm's branch works and foundries at Penistone in Yorkshire will now be known as The David Brown Foundries Co. The tool division of the main works at Huddersfield has adopted the title of The David Brown Tool Co. The third alteration is in the style of C. J. Fitzpatrick & Co. Ltd., of London, which will now be known as David Brown Gear (London) Ltd.

Aluminum Nail Tests Win Approval in Canada

Pittsburgh

• • • **Aluminum nails,** which may provide a large part of the answer to building problems, have made their appearance in Canada in small quantities and, according to Aluminum Co. of America, have won instant approval. The company states however, that the development is still in the experimental stage and volume production will not be attained until next year.

A limited quantity of the aluminum roofing nails was used in making alterations to a small building in Cornwall, Ont. The contractor in charge of the work stated they could be used in hardwood as well as wire nails, and a man can easily carry enough to last him the entire day.

Of this particular type nail, there are more than 1000 to the pound, and at the price of 60¢ a lb they are cheaper than the ordinary roofing nails that sell at 12¢ a lb, the contractor stated.

The aluminum nails require no galvanizing, since they are completely rust-proof and the so-called 100 lb keg weighs but 34 lb. It was indicated that aluminum nails do not bend any more easily than ordinary wire nails.

The Canadian Reconstruction Dept. officials have stated that companies producing steel wire nails have been experimenting with aluminum nails. Some plants that have been idled by the lack of steel have turned to aluminum and are seeking the correct alloy to give the nail the utmost durability.

Pittsburgh Steel Reports

Pittsburgh

• • • **Net earnings** for Pittsburgh Steel Co., for the quarter ended Sept. 30, 1946, totaled $607,352, while during the 9 months ended Sept. 30, 1946, the company lost $931,222. Since the company had losses in prior years, there were no refunds of federal income taxes available in 1946, and the $474,236 expense incurred in May and June due to the coal strike and $811,297 expense during the January-February steel strike forced the company into the red for the year to date.

Net sales during the third quarter totaled $15,932,053, and $37,602,143 for the first 9 months.

Construction Steel...

New York

• • • **Fabricated steel awards** this week included the following:

2100 Tons, Warren, Pa., Pennsylvania Electric Co. West power station, to American Bridge Co., Pittsburgh.

1200 Tons, Mexico, theatre building, through U. S. Steel Export, to Virgrinia Bridge Co., Roanoke, Va.

800 Tons, Schenectady, N. Y., hospital to Harris Structural Steel Co., New York.

565 Tons, Pittsfield, Mass., extension to building No. 14 to Lehigh Structural Steel Co., Allentown, Pa.

500 Tons, Chicago, distribution plant for Standard Oil to J. T. Ryerson & Son, Chicago.

500 Tons, Bear Creek, Baltimore County, Md., bridge, McLean Contracting Co., low.

350 Tons, Paterson, N. J., highway underpasses Union Building and Construction Co. Contractor to American Bridge Co., Pittsburgh.

350 Tons, Skokie, Ill., building for J. T. Marsch to J. T. Ryerson & Son, Chicago.

320 Tons, La Porte, Ind., extension to buildings 78 and 82, Larson & Donaldson Contracting Co. to American Bridge Co., Pittsburgh.

280 Tons, Radford, Va., American Viscose Co., storage and unloading building, to Virginia Bridge Co., Roanoke, Va.

230 Tons, Somerville, Mass., deisel shop for Boston & Maine R.R. to American Bridge Co., Pittsburgh.

210 Tons, Montville, Conn., Connecticut Light & Power Co., generator supports, through United Engineering Co., to American Bridge Co., Pittsburgh.

175 Tons, Columbia Falls, Mont., warehouse building, Hungry Horse Government Camp, U. S. Bureau of Reclamation, Denver, Spec. 1326, to American Bridge Co., Pittsburgh.

130 Tons, Northborough, Mass., inverted pipe siphon for Metropolitan Water Commission to Walso Holyoke Boiler Works, Holyoke, Mass.

• • • **Fabricated steel inquiries** this week included the following:

7000 Tons, New York City, homes, New York Housing Authority.

1300 Tons, Alameda, Calif., bridge for Columbia Steel Co., San Francisco.

900 Tons, Rochester, Iowa, highway bridge for State of Iowa.

650 Tons, Wilmington, Del., housing project, Collins Park Builders Inc.

500 Tons, Tampa, Fla., steam station, Stone & Webster, contractors.

500 Tons, Los Angeles, berths 179 and 180, transit shed, bids open Nov. 27.

400 Tons, Tacoma, Wash., six bridges for U. S. Engineers.

400 Tons, Odair, Wash., warehouse, U. S. Bureau of Reclamation, Grand Coulee Dam.

325 Tons, Opelike, Ala., addition to mill building, Batson Cook Co.

300 Tons, Norristown, Pa., Philadelphia Electric Co., bridge, Nov. 25.

200 Tons, De Pere, Wis., building for Nicolet Paper Co.

200 Tons, Houston, building construction for Crane Co., Chicago.

158 Tons, Grand Junction, Col., Veterans Administration hospital.

135 Tons, Dover, N. H., machine shop for Kidder Press Co.

100 Tons, Woburn, Mass., warehouse for Atlantic Gelatin Co.

• • • **Reinforcing bar awards** this week included the following:

300 Tons, Tacoma, Wash., 34th St. bridge, through Guy F. Atkinson Co. to Bethlehem Steel Co., Bethlehem, Pa.

• • • **Reinforcing bar inquiries** this week included the following:

820 Tons, Grand Junction, Col., Veterans Administration hospital.

458 Tons, Los Angeles, undercrossing on Santa Ana Parkway at Olympic Parkway, California Div. of Highways, Los Angeles, bids open Dec. 12.

350 Tons, Milwaukee, service tunnel for Blatz Brewing Co. has been suspended because of the high cost of floating the building so that the tunnel could be constructed.

298 Tons, Los Angeles, undercrossing on Santa Ana Parkway at Esperanza and at Indiana, California Div. of Highways, Los Angeles, bids open Dec. 12.

297 Tons, Oakland, Calif., construction of pipeline from Walnut Creek to Bixler Station, East Bay Municipal Utility District Spec. 73, bids open Dec. 11.

160 Tons, Michigan City, Ind., state prison for State of Indiana.

• • • **Plate awards** this week included the following:

200 Tons, Chicago, barrel storage tank for Pure Oil Co. to General American Tank Car Co.

• • • **Steel pipe awards** this week included the following:

2030 Tons, San Francisco, steel pipe for Water Dept., Purchaser of Supplies, Inv. 3706, to Western Pipe & Steel Co.

190 Tons, San Francisco, Purchaser of Supplies, Inv. 3707, dipped slip joint steel pipe, to Western Pipe & Steel Co.

100 Tons, Sacramento, steel force main, to Western Pipe & Steel Co.

• • • **Rail awards** this week included the following:

65,000 to 87,500 Tons standard rails for Pennsylvania R. R. Carnegie-Illinois Steel Corp. received approximately 50 pct of the tonnage.

• • • **Railroad car awards** this week included the following: Railway Express Agency has placed an order for 500 refrigerator cars with the American Car & Foundry Co., New York.

Premium Payment Plans On Building Materials To Remain in Effect

Washington

• • • **Retention of existing** premium payment plans on building materials as long as they are "necessary and effective" has been announced by the National Housing Agency. While all plans will be reviewed, no substantial changes will be made without consultation with industry representatives.

In a telegram on Nov. 16 to all producers participating in the building subsidy program, Deputy Expediter Philip H. Coombs, director of NHA's Office of Materials Supply, declared:

"This is to advise that all premium payment programs are still in effect despite price control. It is the intention of the Housing Expeditor to retain all existing premium payment programs as long as they continue to be necessary and effective in achieving increased production for the Veterans' Emergency Housing Program. All programs will be reviewed and changes made only if price movements eliminate and reduce their necessity and usefulness. None will be substantially altered without prior consultation with industry representatives."

WAA "One-Stop" Service Aids Surplus Buyers

Washington

• • • **Part of the "big push"** scheduled for November, December and January, during which it hopes to put up for sale at least 75 pct of the consumer, capital and producer goods it now has on sale, WAA is setting up additional "customer service centers" to make it easier to buy war surplus property. Conveniently located in major population areas, the new marketing centers will serve customers by mail, by telephone or in person.

The centers will follow the pattern of wholesale jobbing houses, displaying and selling items in quantities. They will not sell in small lots directly to the consumer level. A WAA official said the centers are being established with a view to "one-stop" service—so that customers will be able to find out about, and buy, different surplus items without having to visit a number of local offices or travel to distant WAA regions where certain property might be located. Each service center is to have information about property located in all parts of the country.

MACHINE TOOLS

. . . News and Market Activities

Some Machine Prices Up; Others Steady

• • • **While no price** is too low for a bear or too high for a bull, in the price adjustment dilemma currently surrounding the entire metalworking industry it is already apparent that machine tool builders' price increases will follow no particular pattern.

Many producers, including those operating without escalator clauses on their orders, will not increase their prices before Apr. 1, 1947 and then only if the costs of component parts have risen incommensurately. Other segments of the industry, including some of the larger companies, have increased their prices from 10 to 20 pct, and in at least one case there has been a 20 pct increase almost straight across the board, which will apply to anybody who had an order in for delivery after April.

The price of electric motors has already increased, and with cast scrap for the foundries being sold at $40 a ton in a number of areas, the cost of castings is sure to follow. A price increase in steel will mean a price increase in forgings, bearings and a variety of other components, which will affect production costs of the heavy machines, boring mills, planers, etc. in short order.

According to qualified observers, however, the industry faces terrific opposition in the low cost machines being sold by War Assets Administration, with every prospect that the price will still go lower.

At the same time, the industry's October orders were lower, down about $500,000 from September, and even with the price increase made prior to removal of all controls, a $500,000 drop means an important number of units under present circumstances and in a month seasonally good for the industry.

Cancellations in October were down to about half the September total, $1,500,000 as compared with $2,900,000, but cancellations for the year through September are about 9 pct, a figure qualified observers consider very high in view of the normal aggregate of less than 3 pct.

About 60 pct of the industry has been operating with escalator clauses, others have been operating on the basis that prices were as of the date of shipment, particularly the builders of special machines; thus it seems that if the industry should increase prices generally 15 pct, customers now on the books will probably feel they're getting their machines cheap.

According to reports percolating through the trade, a change of design in lathes is in order all along the line, particularly standard toolroom lathes. Costs are so high in many cases that this item is not making a good showing in a number of plants, and some facelifting will doubtless be done before the machine tool show.

Despite the bad business weather reportedly ahead, there has been very little change in employment in machine tool plants in the Ohio-Michigan-Kentucky area. According to a United States Employment Service survey of the 80 plants in the three-state region, these plants employed 41,200 in September, or about 200 less than they were employing in January.

However, during the same period, employment in 2180 manufacturing plants in the region increased nearly 24 pct.

While the industry did not participate in the huge September increase, it is worthy of note that during the latter part of the period employment in the 80 plants was increasing slightly. According to the USES survey, September production schedules in these plants called for a further employment increase of 500 by November and nearly 700 by January 1947.

Only three of the 80 plants anticipated reductions from their September employment, while 46 expected to hire additional workers and 31 expected to maintain their September employment levels.

Labor turnover in these machine tool plants has been far below the average for all plants included in the survey. In August, the most recent month for which figures are available, separations in the machine tool plants amounted to only 3.4 per 100 workers employed as compared with 6.5 for all plants covered by the USES survey in the region. A large share of the machine tool separations are of course still due to laying off of nonveterans as veterans come back for their old jobs.

In Cincinnati, machine tool builders indicate that so far as their prices are concerned, the end of OPA will make no difference unless the rumored 30¢ increase in electric motors takes effect. In this event, the standard type machines, which are equipped with motors, will have to be adjusted accordingly. However, one builder in the area reports that most of his machines are not equipped with motors and therefore this increase will not affect them.

While some builders are gearing for greater production and sales during 1947 and 1948, others indicate that there will be 10 pct less business in 1947, and that the high production industries are not buying machine tools due to uncertain labor conditions.

Most builders indicate the foreign business is still approximately 40 pct of the total demand, though there were fewer foreign visitors in machine tool plants in the area the past week.

Richard Bredenbeck, president of Advance Die & Tool Co., Cleveland, has been named president of the Cleveland Tool, Die & Machine Shops Assn., an affiliate of the Cleveland Chamber of Commerce, succeeding R. H. Cope, controller of Bunnell Machine & Tool Co. Other new officers of the association are: John A. Barth, chief engineer of Barth Stamping & Machine Works, vice-president, and J. F. Wedler, treasurer, Wedler Bros., secretary-treasurer. Three new trustees are Mr. Barth, W. L. Warrender, secretary-treasurer of Tools & Gages, Inc., and J. C. Schurger, president, Star Machine & Tool Co.

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NONFERROUS METALS

. . . News and Market Activities

Can Makers Ask CPA To Keep Tin Controls

Washington

• • • **Faced with** a world tin deficit of about 48,000 tons next year, the Can Manufacturers' Industry Advisory Committee has recommended continuation of CPA controls throughout 1947 on tinplate requirements. The industry members said that CPA's orders affecting tin, M-21, M-81, and M-43, must be continued to forestall a serious shortage of packaged foods in 1947.

The 1947 world supply of tin, according to Combined Tin Committee estimates will total about 141,600 tons, a 47,200 ton increase over the expected 1946 supply. However, world demand is expected to increase to 190,000 tons next year. The 1946 world screened requirements totaled 145,600. U. S. needs are expected to jump to 85,000 tons next year, an increase of 24,900 tons over 1946.

•

Raise Zinc Oxide Prices

New York

• • • **Producers of zinc** oxide have announced price increases on their products.

The American Zinc, Lead and Smelting Co. has announced the following carload lot prices effective Nov. 18: American Process zinc oxide, lead free, 9¢ per lb, an increase of 1¢; French Process, 11.25¢, an increase of 1¢; 35 pct leaded zinc oxide, 9.75¢, an increase of 1.75¢; 50 pct leaded zinc oxide, 10.125¢, an increase of 2.125¢. The usual 0.25¢ differential applies to less than carload lots. However these small orders are sold now on an f.o.b. plant basis; formerly the price included delivery to consumer.

The Eagle Picher Lead Co. has announced the following carload lot prices effective Nov. 12: American Process zinc oxide, lead free, 9.50¢; 35 pct leaded zinc oxide, 10.125¢; 50 pct leaded zinc oxide, 10.375¢. These prices are f.o.b. plant, freight allowed.

However, with the increase of the lead price to 11.80 effective Nov. 18, it is expected that there may be further increases in some of these products.

•

Silvery Pig Up $2 a Ton

New York

• • • **Producers of** electric furnace silvery pig iron have announced a price increase of $2.00 per gross ton on all grades effective Nov. 1.

Keokuk Electro-Metals Co., Keokuk, Iowa has established the price of this product per gross ton containing 14.01 pct to 14.50 pct silicon to $53.25, f.o.b. Keokuk; $50.00 f.o.b. Jackson, Ohio; $51.25 f.o.b. Buffalo.

The Pittsburgh Metallurgical Co., Niagara Falls, N. Y. has established a price of $51.25 for the same grade f.o.b. Niagara Falls, N. Y.

Silicon differentials and premiums for low phosphorus and manganese remain the same as previous quotations.

•

Lead at 11.80¢ New York

New York

• • • **The price of lead** has been increased by the American Smelting & Refining Co. to 11.80¢ per lb at New York effective Nov. 18. The St. Joseph Lead Co. has also announced an increase to 11.65¢ at St. Louis, delivered New York 11.80¢. This price increase brings the domestic price of lead into line with the world price plus duty.

Cents per pound

Nonferrous Metals Prices

	Nov. 13	Nov. 14	Nov. 15	Nov. 16	Nov. 18	Nov. 19
Copper, electro., Conn.	17.50	17.50	17.50	17.50	17.50	17.50
Copper, Lake, Conn.	17.50	17.50	17.50	17.50	17.50	17.50
Tin, Straits, New York	70.00	70.00	70.00	....	70.00	70.00
Zinc, East St. Louis	10.50	10.50	10.50	10.50	10.50	10.50
Lead, St. Louis	13.35	10.35	10.35	10.35	11.65	11.65

Aluminum Window Body Asks Vet Housing Aid

Washington

• • • **Recommendation** was made to CPA by the newly formed Aluminum Window Industry Advisory Committee at a meeting on Nov. 14, that priorities assistance be given to obtain aluminum window components for the Veterans' Emergency Housing program. Specifically, the Committee suggested such aid for hardware, rubber, screws, rivets and similar components, as well as for production equipment for possible expansion of facilities.

•

Spiegeleisen Prices Advanced $4 Per Ton

New York

• • • **The New Jersey** Zinc Co. has raised its price of spiegeleisen by $4.00 per ton effective Nov. 14 bringing the price for 19 to 21 pct manganese to $40.00 per gross ton in carload lots f.o.b. Palmerton, Pa. The price of 16 to 19 pct manganese is $39 per ton. There has been no announcement as to price increase in spiegeleisen at Pittsburgh and Chicago, although it is believed that the producer may wish to follow suit in the near future.

•

British Report Shows Use of Lead Declining

London

• • • **Figures showing** the consumption of nonferrous metals in the United Kingdom during the third quarter of 1946 have been issued by the Ministry of Supply, and the following table gives comparable figures in net tons of the consumption of virgin metal only:

	First Quarter 1946	*Second Quarter 1946*	*Third Quarter 1946*
Zinc	56,731	57,733	60,328
Lead	62,077	53,774	51,422
Tin	6,071	7,222	7,384
Cadmium	142	154	161
Antimony	1,668	1,426	1,715

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, f.o.b. shipping point (min. 10,000 lb)	15.00
Aluminum pig, f.o.b. shipping point	14.00
Antimony, American, Laredo, Tex.	23.50
Beryllium copper, 3.75-4.25% Be; dollars per lb contained Be	$14.75
Beryllium aluminum, 5% Be; dollars per lb contained Be	$30.00
Cadmium, del'd	$1.25 to $1.50
Cobalt, 97-99% (per lb)	$1.50 to $1.57
Copper, electro, Conn. Valley	17.50
Copper, electro, New York	17.25
Copper, lake, Conn. Valley	17.50
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$32.25
Iridium, dollars per troy oz.	125.00
Lead, St. Louis	11.65
Lead, New York	11.80
Magnesium, 99.8 + %	20.50
Magnesium, sticks, carlots	36.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$92 to $94
Nickel, electro, f.o.b. refinery	35.00
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$69 to $72
Silver, New York, cents per oz.	90.125
Tin, Straits, New York	70.00
Zinc, East St. Louis	10.50
Zinc, New York	10.94
Zirconium copper, 6 pct Zr, per lb contained Zr	$ 6.00

Remelted Metals

(Cents per lb)

Aluminum Ingots

Aluminum, No. 12 Fdy. (No. 2)	15.00
Piston alloys, No. 122	15.25 to 15.50
AXS 679	15.25 to 15.50
Aluminum deoxidizing No. 4	13.50 to 14.25
Brass Ingot	
85-5-5-5 (No. 115)	19.00 to 19.25
88-10-2 (No. 215)	23.25 to 23.50
80-10-10 (No. 305)	22.75 to 23.00
No. 1 Yellow (No. 405)	15.00 to 15.25

Electroplating Supplies

Anodes

(Cents per lb, f.o.b. shipping point in 500 lb lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer	....
Electrodeposited	....
Rolled, oval, straight, delivered	....
Curved, 18 in. or longer, delivered	....
Brass, 80-20, frt allowed	
Cast, oval, 15 in. or longer	....
Zinc, cast, 99.99	....
Nickel, 99 pct plus, frt allowed	
Cast	47
Rolled, depolarized	48
Silver, 999 fine	
Rolled, 1000 oz lots, per oz	93⅞

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 1-5 bbl	.....
Copper sulphate, 99.5, crystals, bbls	.....
Nickel salts, single, 425 lb bbls, frt allowed	13.50
Silver cyanide, 100 oz lots, per oz	0.749
Sodium cyanide, 96 pct, domestic, 125 lb drums	15.00
Zinc cyanide, 100 lb drums	.....
Zinc, sulphate, 89 pct, crystals, bbls, frt allowed	.....

Mill Products

Aluminum

(Cents per lb, base, subject to extras for quantity, gage, size, temper and finish)

Drawn tubing: 2 to 3 in. OD by 0.065 in. wall: 3S, 43.5¢; 52S-O, 67¢; 24S-T, 71¢; base, 30,000 lb.

Plate: ¼ in. and heavier: 2S, 3S, 21.2¢; 52S, 24.2¢; 61S, 23.8¢; 24S, 24S-AL, 24.2¢; 75S, 75S-AL, 30.5¢; base, 30,000 lb.

Flat Sheet: 0.136-in. thickness: 2S, 3S, 23.7¢; 52S, 27.2¢; 61S, 24.7¢; 24S-O, 24S-OAL, 26.7¢; 75S-O, 75S-OAL, 32.7¢; base, 30,000 lb.

Extruded Solid Shapes: factor determined by dividing the perimeter of the shape by its weight per foot. For factor 1 through 4, 3S, 26¢; 14S, 32.5¢; 24S, 35¢; 53S, 61S, 28¢; 63S, 27¢ 75S, 45.5¢; base, 30,000 lb.

Wire, Rod and Bar: screw machine stock, rounds, 17S-T, ¼ in., 29.5¢; ½ in., 37.5¢; 1 in., 26¢; 2 in., 24.5¢; hexagons, ¼ in., 35.5¢; ½ in., 30¢; 1in., 2 in., 27¢; base, 5000 lb. *Rod:* 2S, 3S, 1¼ to 2½ in. diam, rolled, 23¢; cold-finished, 23.5¢ base, 30,000 lb. *Round Wire:* drawn, coiled, B & S gage 17-18: 2S, 3S, 33.5¢; 56S, 39.5¢; 10,000 lb base; B & S gage 00-1: 2S, 3S, 21¢; 56S, 30.5¢. B & S 15-16: 2S, 3S, 32.5¢; 56S, 38¢; base, 30,000 lb.

Magnesium

(Cents per lb, f.o.b. mill)

Sheet and Plate: Ma, FSa, ¼ in.,54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 14, 69¢-74¢; 16, 79¢-81¢; 18, 87¢-89¢; 22, $1.25-$1.31; 24, $1.71-$1.75. Base quantity, 30,000 lb.

Round Rod: M, diam in. ⅛, 55¢; ¼, 47¢; ⅜, 46¢; ½, 45¢; ¾, 44¢; 1¾, 43.5¢; 2, 42.5¢; 3, 41.5¢; 4, 42.5¢ 5, 43.5¢; 6 & 7 in., 44¢. Base price, 5000-10,000 lb.

Square and Hexagonal Bar: M, diam in. ⅛, 58¢; ¼, 50¢; ⅜, 48¢; ½, 47.5¢; ¾, 46.5¢; 1¾, 45.5¢; 2, 44.5¢; 3, 43.5¢; 4 & 5 in. 44.5¢; 6 & 7 in., 45¢. Base quantity, 5000-10,000 lb.

Tubing: Varies with wall thickness and outside diameter.

Nickel and Monel

(Cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	49	39
No. 35 sheets	..	37
Strip, cold-rolled	55	40
Rod		
Hot-rolled	45	35
Cold-drawn	50	40
Angles, hot-rolled	45	35
Plates	47	37
Seamless tubes	75	65
Shot and blocks	..	28

Zinc

(Cents per lb, f.o.b. mill)

Sheet, l.c.l.	15.40
Ribbon, ton lots	14.50
Plates	
Small	13.25
Large, over 12 in.	14.25
Lithographic, ungrained	17.25

Scrap Metals

(Dealers' buying prices, f.o.b. New York)

Copper and Brass

(Cents per lb)

No. 1 heavy copper and wire	13¼—13¾
No. 2 heavy copper and wire	12¼—12¾
Light copper	10¾—11¼
Auto radiators (unsweated)	10½—10¾
No. 1 composition	12¾—13¼
No. 1 composition turnings	11¾—12¼
Clean red car boxes	9½—10
Cocks and faucets	9¼— 9¾
Mixed heavy yellow brass	8 — 8½
Old rolled brass	8 — 8½
Brass pipe	9½—10
New soft brass clippings	9½—10
Brass rod ends	9 — 9½
No. 1 brass rod turnings	9 — 9½

Aluminum

(Cents per lb)

Alum. pistons with struts	3½— 4
Aluminum crankcases	5½— 6
2S aluminum clippings	8 — 8¼
Old alum. Sheet & utensils	6 — 6½
Mixed alum. borings and turnings	1½— 2
Misc. cast aluminum	5½— 5¾
Dural clips (24S)	4½— 5

Zinc

(Cents per lb)

New zinc clippings	8 — 8¼
Old zinc	6 — 6¼
Zinc routings	3 — 3⅛
Old die cast scrap	3 — 3¼

Nickel and Monel

(Cents per lb)

Pure nickel clippings	18 —19
Clean nickel turnings	14 —15
Nickel anodes	16½—17½
Nickel rod ends	17 —18
New Monel clippings	15 —16
Clean Monel turnings	10 —10½
Old sheet Monel	12 —12½
Old Monel castings	10 —11
German silver clippings, mixed	10½—11
German silver turnings, mixed	7 — 7¼

Lead

(Cents per lb)

Soft scrap lead	8 — 8½
Battery plates (dry)	5¼— 5½

Miscellaneous

(Cents per lb)

Block tin	60 —
No. 1 pewter	46 —48
No. 1 auto babbitt	36 —37
Mixed common babbitt	9½—10
Solder joints	9 — 9½
Siphon tops	30 —32
Small foundry type	15 —15½
Monotype	12½—13
Lino and stereotype	12 —12½
Electrotype	10½—11
New type shell cuttings (nom.)	11 —11½
Clean hand picked type shells	5 — 5½
Lino and stereo dross	5½— 6
Electro dross	3½— 4

American Foundrymen Elect 1946-47 Officers Of Brass, Bronze Group

Chicago

• • • **Appointment** of the 1946-47 brass and bronze division executive committee of American Foundrymen's Association has been announced by S. C. Massari, technical director. Chairman is D. Frank O'Connor, foundry superintendent, American Saw Mill Machine Co., Hackettstown, N. J. Walter W. Edens, foundry superintendent, Ampco Metal, Inc., Milwaukee, is vice chairman and Joseph E. Foster, AFA, Chicago, secretary. Others named include:

W. M. Ball, Jr., superintendent, Magnus Brass Div., National Lead Co., Cincinnati; W. B. George, metallurgist and foundry engineer, R. Lavin & Sons, Inc., Chicago; E. W. Horlebein, president, Gibson & Kirk Co., Baltimore, and a national AFA director; B. M. Loring, senior metallurgist, U. S. Naval Research Laboratory, Washington, D. C.; B. A. Miller, superintendent of foundries, Baldwin Locomotive Works, Philadelphia, and H. M. St. John, superintendent, Crane Co., Chicago.

SCRAP

. . . News and Market Activities

Big Buyers Are Fighting Higher Prices

New York

• • • **Confusion still reigned** in iron and steel scrap centers as the market entered its second week of uncontrolled prices. Large consumers were holding firm on last weeks' lines although late reports indicated attempts to blast some gaps in the line.

Battles raged all along the front and behind the lines on the amount of springboard that would be acceptable, and attempts to hold fast to a $5 yardstick for the heavy melting increase were meeting sporadic resistance.

Some sources will not move heavy openhearth scrap until they can get more than a $5 advance over the old prices. Cast is being forced up; the only thing keeping it in sight early this week was the fact that pig iron prices were holding firm.

Indications are that the market will remain uncertain for some time to come. Not until more lists are bid upon and more sales made will it be possible to get a clearer price picture. For this reason not a few openhearth steel buyers had not even entered the market on the eighth day of free prices. Large buyers were showing resistance to further increases and the possibility of a coal strike also had a tendency to ease demand.

An 80-car railroad list in Chicago pushed many prices to new highs, but how long they will hold in Chicago or whether they will affect other markets remains to be seen.

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PITTSBURGH—While the scrap price fluctuations have simmered down to last week's levels on the heavy grades, there is some anxiety as to what the successful bidders for the Pennsylvania R.R. scrap have offered. There is considerable pressure to hold scrap prices at present levels, but there are some bids on the railroad scrap that are far above present levels. The normal differential of $2.50 has been established on low phos to grade, making this price $27.50 to $28. Some consumers are trying to limit the springboard they will pay, but the success of this action remains to be seen. Fluctuations in eastern markets may have an effect on Pittsburgh markets, but as yet the pressure in the east has not sent local markets upward.

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CHICAGO—Small foundries desparate for cast are keeping this part of the market in confusion. Railroad lists were withheld for one week following decontrol with the exception of Rock Island's substantial offering. Mills here have not yet confined the maximum springboard they are willing to pay. Outlying regions such as Rockford and Milwaukee are holding out for $25 on No. 1 heavy melting and may get it. Mills continue to buy despite the coal strike and hope to build up their inventories as the operating rates go down.

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PHILADELPHIA—Prices of scrap are still in a period of adjustment but current prices quoted in this market reflect going prices plus transportation costs. Cast prices are higher with governing transactions reported at $38 to $39 per ton delivered to the foundry. Although the mills have not yet been able to observe an improvement in the volume of scrap moving, it is the belief of some dealers that there is some slight improvement apparent.

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NEW YORK—Attempts to apply $5 a ton as a yardstick in gaging overall increases on heavy melting steel have run into some resistance where different rail and water freight rates meant price differentials to scrap suppliers in the same area. Though most large consumers appear determined to hold the openhearth advance to $5 some buyers have offered more, though tonnages reported to date are considered insufficient to establish a higher market.

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DETROIT—With the possibility of a coal strike added to other imponderables, the largest buyers in this area have yet to come into the market so that present prices, while indicative of what these buyers seem likely to do, are not a reflection of actual sales to the largest scrap users. A scramble is on among foundries trying to maintain adequate supplies of scrap but hesitant about paying an increase which has lifted the price from $25 per gross ton to $35 to $40 per net ton. Most sales of foundry scrap are being made on agreement to negotiate the price later and grading restrictions are being interpreted loosely.

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CLEVELAND — Some clarification of scrap prices has taken place since last week and most of the trade is sticking pretty close to the "formula" and waiting for the outcome of the Pennsylvania railroad lists. Receipts are about average at most mills and one valley consumer was offered some low phos, plates, at $27.50 delivered, and refused to take it for the openhearth. Cast is still the problem child both in supply and price, with sales ranging up to $40 reported.

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BOSTON — Market for practically all classes of material is very largely nominal, it not having digested price advances. That for all grades of cast as well as stove plate generally is $34 to $35 a ton, but odd sales of truckloads have been made as high as $40 a ton to distress foundries.

BUFFALO—Mill buying hoisted heavier steelmaking scrap $5 above the late but unlamented OPA ceilings in the past week and brought order out of trade confusion. Borings and turnings lagged with gains of $2.50. Foundry grades climbed $3 to $5, except for clean auto cast, which lost its premium rating and fell into the same bracket with No. 1 cupola at $28 to $30. Prices in the rail section were less definite. Some roads have served notice of $5 flat advances, which have been reflected in local quotations, but the Pennsylvania list this week was expected to give a better idea of the pattern. Low phos plate displayed independent strength, with firm sales reported at $28, or $6.25 over the old maximum. Leading brokers said the price incentive had "really opened things up" and scrap already was beginning to move in better volume.

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ST. LOUIS — The price increases brought out a considerable tonnage of the openhearth scrap but dealers are still holding the foundry grades for higher prices. Some of the country dealers feel that even the $5 price will be exceeded but the belief here is that the mills will hold the line and their inventories are said to be in such shape that they can well do so for the remainde of 1946. The market for cast is still not clear. Some users are hard put for supplies and are willing to pay almost any price to get material and one hears reports of some sales at wild prices which do not establish the market.

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CINCINNATI—The market is definitely unsettled, with dealers and brokers jockeying for position on prices. Bidding has been brisk and it appears that prices on mill products would be up an average of $5.00 a ton, but no sufficiently substantial deals have yet been closed to indicate a definite price. Prices are up from $1.50 to $5.00 per ton on cost grades, while some melters have been willing to pay long haul prices in order to get scrap. The supply, however, continues to be tight, and in the absence of sufficiently available supply, a definite setting of prices is difficult.

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TORONTO — Scrap iron and steel stocks throughout Canada are at the lowest level in years and dealers report fresh receipts running less than 30 pct of requirements. While scrap offerings from industrial plants has started to show some improvement there has been falling off in shipments from most other sources.

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Correction

• • • **Scrap production at the Doan Salvage Co., Bordentown, N. J., a subsidiary of the North American Smelting Co., Philadelphia was indicated in error to be 30,000 tons per month in the issue of Nov. 14, p 138. The correct figure is 3000 tons per month.**

IRON AND STEEL SCRAP PRICES

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$25.00 to	$25.50
RR. hvy. melting	26.00 to	26.50
No. 2 hvy. melting	25.00 to	25.50
RR. scrap rails	26.50 to	27.00
Rails 3 ft. and under	28.50 to	29.00
No. 1 comp'd bundles	25.00 to	25.50
Hand bdld. new shts.	25.00 to	25.50
Hvy. axle turn.	24.50 to	25.00
Hvy. steel forge turn.	24.50 to	25.00
Mach. shop turn.	20.00 to	20.50
Short shov. turn.	22.00 to	22.50
Mixed bor. and turn.	20.00 to	20.50
Cast iron borings	20.00 to	20.50
No. 1 cupola cast.	28.00 to	30.00
Heavy breakable cast	25.50 to	26.00
Malleable	27.00 to	27.50
RR. knuck. and coup.	29.50 to	30.00
RR. coil springs	29.50 to	30.00
Rail leaf springs	29.50 to	30.00
Rolled steel wheels	29.50 to	30.00
Low phos.	27.50 to	28.00

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$24.25 to	$24.75
No. 2 hvy. melting	23.75 to	24.25
No. 1 bundles	24.25 to	24.75
No. 2 dealers' bndls.	23.75 to	24.25
Bundled mach. shop turn.	23.75 to	24.25
Galv. bundles	21.50 to	22.00
Mach. shop turn.	17.25 to	17.75
Short shovels, turn.	19.25 to	19.75
Cast iron borings	16.75 to	17.25
Mix. borings & turn.	17.25 to	17.75
Low phos. hvy. forge	27.50 to	28.00
Low phos. plates	26.25 to	26.75
No. 1 RR. hvy. melt.	24.75 to	25.25
Reroll rails	33.00 to	33.50
Miscellaneous rails	33.00 to	33.50
Angles & splice bars	28.50 to	29.00
Locomotive tires, cut		24.25*
Cut bolsters & side frames	28.50 to	29.00
Standard stl. car axles		25.75*
No. 3 steel wheels	28.50 to	29.00
Couplers & knuckles	28.50 to	29.00
Malleable	33.00 to	36.00
No. 1 mach. cast.	37.50 to	38.00
Rails 3 ft. and under	32.00 to	32.50
No. 1 agricul. cast.	29.00 to	29.50
Hvy. breakable cast.	29.00 to	29.50
RR. grate bars	30.25 to	30.50
Cast iron brake shoes	30.25 to	30.50
Stove plate	33.50 to	34.00
Clean auto cast.		27.00*
Cast iron carwheels	30.50 to	31.00

CINCINNATI

Per gross ton delivered to consumer:

Cast grades f.o.b. shipping point

No. 1 hvy. melting		$19.50*
No. 2 hvy. melting		19.50*
No. 1 bundles		19.50*
No. 2 bundles		19.50*
Mach. shop turn.	$10.50 to	11.00
Shoveling turn.	12.50 to	13.00
Cast iron borings	11.50 to	12.00
Mixed bor. & turn.	11.50 to	12.00
Low phos. plate		22.00*
No. 1 cupola cast		25.00*
Hvy. breakable cast.		20.00*
Stove plate		23.00*
Scrap rails		21.00*

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars

No. 1 hvy. melting		$20.35
No. 2 hvy. melting		20.35
Nos. 1 and 2 bundles		20.35
Busheling		20.35
Turnings, shovelings	$15.00 to	16.00
Machine shop turn.	13.00 to	14.00
Mixed bor. & turn.	13.00 to	14.00
Cl'n cast, chem. bor.	15.06 to	16.15
No. 1 machinery cast	34.00 to	35.00
No. 2 machinery cast	34.00 to	35.00
Breakable cast.	34.00 to	35.00
Stove plate	34.00 to	35.00

DETROIT

Per gross ton, brokers' buying prices:

No. 1 hvy. melting	$22.32
No. 2 hvy. melting	22.32
No. 1 bundles	22.32
New busheling	22.32
Flashings	17.32*
Mach. shop turn	14.82
Short shov. turn.	16.82

Going prices as obtained in the trade by IRON AGE editors, based on representative tonnages. Pending establishment of a market in some districts and in certain grades, the former OPA ceiling price is inserted for reference, followed by an asterisk.

Cast iron borings		15.82
Mixed bor. & turn.		14.82
Low phos. plate		19.82*
No. 1 cupola cast.	$35.00 to	40.00
Charging box cast	30.00 to	32.00
Hvy. breakable cast	29.00 to	31.00
Stove plate	33.00 to	35.00
Automotive cast.	35.00 to	40.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$24.00 to	$25.00
No. 2 hvy. melting	24.00 to	25.00
No. 2 bundles	24.00 to	25.00
Mach. shop turn.	16.50 to	18.75
Shoveling turn.	18.25 to	18.75
Cast iron borings		14.75*
Mixed bor. & turn.		13.75*
No. 1 cupola cast	38.00 to	40.00
Hvy. breakable cast	33.00 to	35.00
Cast. charging box	34.00 to	36.00
Clean auto cast	38.00 to	40.00
Hvy. axle forge turn.	20.75 to	21.25
Low. phos. plate	26.50 to	27.50
Low phos. punchings	26.50 to	27.50
RR. steel wheels		23.25*
RR. coil springs		23.25*
RR. malleable		22.00*

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 heavy melting	$22.50 to	$23.00
Bundled sheets	22.50 to	23.00
Mach. shop turn.	15.50 to	16.00
Locomotive tires, uncut.	23.50 to	24.00
Misc. std. sec. rails	24.00 to	24.50
Rerolling rails	26.00 to	26.50
Steel angle bars	24.00 to	24.50
Rails 3 ft. and under	26.50 to	27.00
RR. springs	24.50 to	27.00
Steel car axles	29.50 to	30.00
Stove plate	25.00 to	27.00
Grate bars		25.00
Brake shoes		17.75*
Malleable	29.00 to	29.50
Cast iron carwheels	27.00 to	27.50
No. 1 mach'ery cast		30.00
Breakable cast.		25.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$22.00 to	$22.50
No. 2 hvy. melting	22.00 to	22.50
No. 2 bundles	22.00 to	22.50
No. 1 busheling	22.00 to	22.50
Long turnings	15.00 to	16.00
Shoveling turnings	15.00 to	16.00
Cast iron borings	14.00 to	15.00
Bar crops and plate		19.50*
Structural and plate		19.50*
No. 1 cast	25.00 to	27.50
Stove plate		23.00*
Steel axles		18.50*
Scrap rails		18.50
Rerolling rails		20.50*
Angles & splice bars		21.00*
Rails 3 ft & under		21.00*
Cast iron carwheels		22.00*

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$25.00 to	$25.50
No. 2 hvy. melting	25.00 to	25.50
Low phos. plate	27.50 to	28.00
No. 1 busheling	23.00 to	23.50
Hydraulic bundles	25.00 to	25.50
Mach. shop turn.	18.00 to	18.50
Short. shovel. turn.	20.00 to	20.50
Cast iron borings	19.00 to	19.50

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting		$20.33
No. 2 hvy. melting		20.33
Comp. black bundles		20.33
Comp. galv. bundles		18.33
Mach. shop turn.		14.15
Mixed bor. & turn		14.15
Shoveling turn.		17.00
No. 1 cupola cast	$32.00 to	35.00
Hvy. breakable cast.	25.00 to	27.00
Charging box cast	25.00 to	27.00
Stove plate	30.00 to	32.00
Clean auto cast.	30.00 to	32.00
Unstrip. motor blks.	25.00 to	27.00
Cl'n chem. cast bor.		14.33*

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$24.25 to	$24.75
No. 1 bundles	24.25 to	24.75
No. 2 bundles	24.25 to	24.75
No. 2 hvy. melting	24.25 to	24.75
Mach. shop turn.	16.75 to	17.25
Shoveling turn.	18.75 to	19.25
Cast iron borings	17.75 to	18.25
Mixed bor. & turn.	16.75 to	17.25
No. 1 cupola cast.	28.00 to	30.00
Charging box cast.	24.00 to	26.00
Stove plate	26.00 to	28.00
Clean auto cast.	28.00 to	30.00
Malleable	29.00 to	29.50
Low phos. plate	27.00 to	29.00
Scrap rails	25.75 to	26.25
Rails 3 ft. & under	27.75 to	28.25
RR. steel wheels	28.75 to	29.25
Cast iron carwheels	27.00 to	27.50
RR. coil & leaf spgs.	28.75 to	29.25
RR. knuckles & coup.	28.75 to	29.25
No. 1 busheling		19.25*

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$24.50 to	$25.00
No. 2 hvy. melting	24.50 to	25.00
Compressed sheet stl.	24.50 to	25.00
Drop forge flashings	24.00 to	24.50
No. 2 bundles	24.50 to	25.00
Mach. shop turn.	17.50 to	18.00
Short shovel.	19.50 to	20.00
No. 1 busheling	22.50 to	23.00
Steel axle turn.	21.50 to	22.00
Cast iron borings	18.50 to	19.00
Mixed bor. & turn.	17.50 to	18.00
No. 2 busheling	21.50 to	22.00
No. 1 machinery cast	34.50 to	35.00
Malleable	29.00 to	29.50
Railroad cast		25.00
Railroad grate bars		20.25
Stove plate		28.00
RR. hvy. melting		20.50*
Rails 3 ft. & under		28.00
Rails 18 in. & under		29.25
Rails for rerolling		28.00
Elec. furnace punch	24.00 to	24.50

SAN FRANCISCO

Per gross ton delivered to consumer:

Cast grade f.o.b. shipping point

No. 1 hvy. melting	$19.50
No. 2 hvy. melting	19.50
No. 2 bales	19.50
No. 3 bales	16.00
Mach. shop turn.	13.00
Elec. furn. 1 ft. und.	19.50*
No. 1 cupola cast.	25.00*
RR. hvy. melting	19.50

LOS ANGELES

Per gross ton delivered to consumer:

Cast grade f.o.b. shipping point

No. 1 hvy. melting	$19.50
No. 2 hvy. melting	19.50
No. 1 bales	19.50
No. 2 bales	19.50
No. 3 bales	16.00
Mach. shop turn.	13.00
No. 1 cupola cast	25.00

SEATTLE

Per gross ton delivered to consumer:

Cast grade f.o.b. shipping point

No. 1 & No. 2 hvy. melting	$17.00
Elec. furn. 1 ft. und.	17.00
No. 1 cupola cast	25.00*
RR. hvy. melting	16.00

HAMILTON, ONT.

Per gross ton delivered to consumer:

Cast grades f.o.b. shipping point

Heavy melting	$17.50*
No. 1 bundles	17.50*
No. 2 bundles	17.00*
Mixed steel scrap	15.50*
Rails, remelting	18.50*
Rails, rerolling	21.50*
Bushelings	13.00*
Mixed borings & turnings	12.50*
Electric furnace bundles	20.50*
Manganese steel scrap	20.00*
No. 1 cast	19.00*
Stove plate	17.50*
Car wheels, cast	19.50*
Malleable iron	16.00*

Comparison of Prices . .

Advances over past week in **Heavy Type**, declines in *Italics*. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.

Flat-Rolled Steel: (cents per pound)	Nov. 19, 1946	Nov. 12, 1946	Oct. 15, 1946	Nov. 20, 1945
Hot-rolled sheets	2.425	2.425	2.425	2.20
Cold-rolled sheets	3.275	3.275	3.275	3.05
Galvanized sheets (24 ga.)*	4.05	4.05	4.05	3.70
Hot-rolled strip				
6-in and under	2.45	2.45	2.45	2.10
Over 6 in.	2.35	2.35	2.35	2.10
Cold-rolled strip	3.05	3.05	3.05	2.80
Plates	2.50	2.50	2.50	2.25
Plates, wrought iron	4.112	4.112	4.112	3.80
Stain's c-r strip (No. 302)	30.30	30.30	30.30	28.00
Tin and Ternplate: (dollars per base box)				
Tinplate, standard cokes..	$5.00	$5.00	$5.00	$5.00
Tinplate, electro (0.50 lb)	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.30	4.30	4.30	4.30
Bars and Shapes: (cents per pound)				
Merchant bars	2.50	2.50	2.50	2.25
Cold-finished bars	3.10	3.10	3.10	2.75
Alloy bars	2.92	2.92	2.92	2.70
Structural shapes	2.35	2.35	2.35	2.10
Stainless bars (No. 302).	25.97	25.97	25.97	24.00
Wrought iron bars	4.76	4.76	4.76	4.40
Wire and Wire Products: (cents per pound)				
Bright wire	3.05	3.05	3.05	2.75
Wire nails	3.75	3.75	3.75	2.90
Rails: (dollars per net ton)				
Heavy rails	$43.39	$43.39	$43.39	$43.00*
Light rails	49.18	49.18	49.18	45.00*
*per gross ton				
Semifinished Steel: (dollars per gross ton)				
Rerolling billets	$39.00	$39.00	$39.00	$36.00
Sheet bars	38.00	38.00	38.00	36.00
Slabs, rerolling	39.00	39.00	39.00	36.00
Forging billets	47.00	47.00	47.00	42.00
Alloy blooms, billets, slabs	58.43	58.43	58.43	54.00
Wire Rods and Skelp: (cents per pound)				
Wire rods	2.30	2.30	2.30	2.15
Skelp	2.05	2.05	2.05	1.90

*Pig Iron: (per gross ton)	Nov. 19, 1946	Nov. 12, 1946	Oct. 15, 1946	Nov. 20, 1945
No. 2 foundry, Phila.	$30.43	$30.43	$30.43	$27.59
No. 2, Valley furnace	28.50	28.50	28.50	25.75
No. 2, Southern, Cin'ti	27.80	27.80	27.80	26.19
No. 2, Birmingham	24.88	24.88	24.88	22.13
No. 2 foundry, Chicago†	28.50	28.50	28.50	25.75
Basic, del'd eastern Pa.	29.93	29.93	29.93	27.09
Basic, Valley furnace	28.00	28.00	28.00	25.25
Malleable, Chicago†	28.50	28.50	28.50	25.75
Malleable Valley	28.50	28.50	28.50	25.75
L. S. charcoal, Chicago	42.34	42.34	42.34	42.34
Ferromanganese‡	135.00	135.00	135.00	135.00

† The switching charge for delivery to foundries in the Chicago district is 60¢ per ton.
‡ For carlots at seaboard.
* Prices retroactive to May 29; the price increase should be reflected in THE IRON AGE Comparison of Prices table since June 4.

Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	$25.25	$25.25	$20.00	$20.00
Heavy melt'g steel, Phila.	24.50	24.00	18.75	18.75
Heavy melt'g steel, Ch'go	24.50	24.00	18.75	18.75
No. 1 hy. comp. sheet, Det.	22.32	17.32	17.32	17.32
Low phos. plate, Youngs'n	27.75	22.50	22.50	22.50
No. 1 cast, Pittsburgh	29.00	29.00	25.00	20.00
No. 1 cast, Philadelphia	39.00	35.00	25.00	20.00
No. 1 cast, Chicago	37.75	29.00	25.00	20.00
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$8.75	$8.75	$8.75	$7.50
Foundry coke, prompt	8.50	8.50	8.50	9.00
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro., Conn.	17.50	17.50	14.375	12.00
Copper, Lake, Conn.	17.50	17.50	14.375	12.00
Tin, Straits, New York	70.00	52.00	52.00	52.00
Zinc, East St. Louis	10.50	10.50	9.25	8.25
Lead, St. Louis	11.65	10.35	8.10	6.35
Aluminum, virgin	15.00	15.00	15.00	15.00
Nickel, electrolytic	35.00	35.00	35.00	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	23.50	23.50	14.50	14.50

Composite Prices . .

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942 and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite prices for the current quarter are an estimate based on finished steel shipments for the previous quarter. These figures will be revised when the actual data of shipments for this quarter are compiled.

	FINISHED STEEL	PIG IRON	SCRAP STEEL
Nov. 19, 1946	2.70711¢ per lb.	$28.13 per gross ton	$24.75 per gross ton
One week ago	2.70711¢ per lb.	$28.13 per gross ton	$19.17 per gross ton
One month ago	2.70711¢ per lb.	$28.13 per gross ton	$19.17 per gross ton
One year ago	2.44104¢ per lb.	$25.37 per gross ton	$19.17 per gross ton

	FINISHED STEEL HIGH	FINISHED STEEL LOW	PIG IRON HIGH	PIG IRON LOW	SCRAP STEEL HIGH	SCRAP STEEL LOW
1946	2.73011¢ July 4	2.54490¢ Jan. 1	$28.13 May 29	$25.37 Jan. 1	$24.75 Nov. 19	$19.17
1945	2.44104¢ Oct. 2	2.38444¢ Jan. 2	25.37 Oct. 23	23.61 Jan. 2	$19.17 Jan. 2	$18.92 May 22
1944	2.30837¢ Sept. 5	2.21189¢ Oct. 5	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943	2.29176¢	2.29176¢	23.61	23.61	$19.17	$19.17
1942	2.28249¢	2.28249¢	23.61	23.61	19.17	19.17
1941	2.43078¢	2.43078¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	23.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1935	2.07642¢ Oct. 1	2.06492¢ Jan. 8	18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
1934	2.15367¢ Apr. 24	1.95757¢ Jan. 2	17.90 May 1	16.90 Jan. 27	13.00 Mar. 13	9.50 Sept. 25
1933	1.95578¢ Oct. 3	1.75836¢ May 2	16.90 Dec. 5	13.56 Jan. 3	12.25 Aug. 8	6.75 Jan. 3
1932	1.89196¢ July 5	1.83901¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1931	1.99626¢ Jan. 13	1.86586¢ Dec. 29	15.90 Jan. 6	14.79 Dec. 15	11.33 Jan. 6	8.50 Dec. 29
1930	2.25488¢ Jan. 7	1.97319¢ Dec. 9	18.21 Jan. 7	15.90 Dec. 16	15.00 Feb. 18	11.25 Dec. 9
1929	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 3

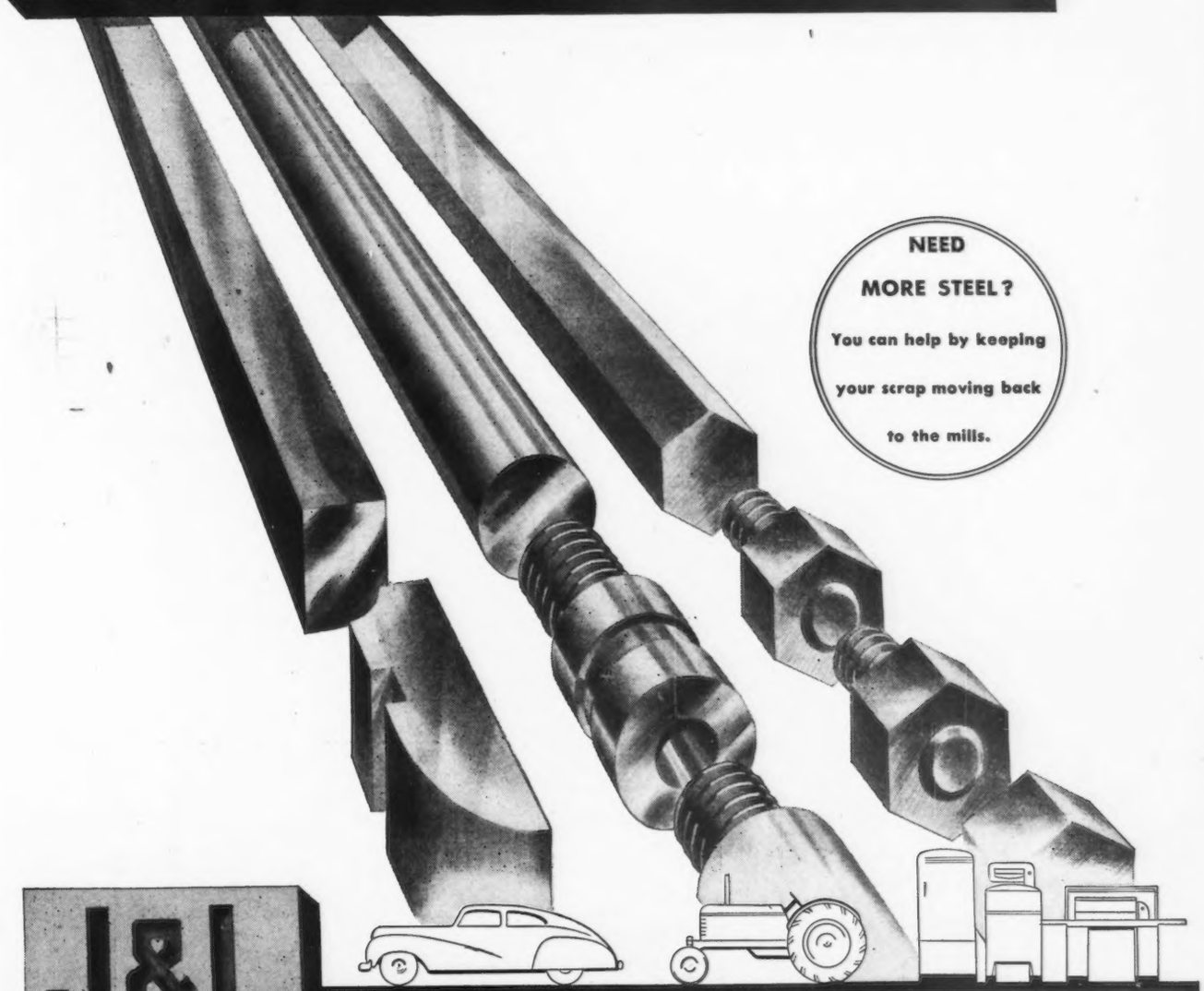
Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 pct of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia, and Chicago.

J&L COLD FINISHED STEEL

FOR EASILY MACHINED · ACCURATE PARTS



J&L STEEL

In addition to improved machinability and longer tool life obtained through use of J&L Cold Finished steel, many manufacturers specify this precision product for its improved surface finish. They also obtain in J&L cold drawn and cold rolled bars and special shapes the higher physical qualities needed for parts of modern high-speed machines. J&L engineers and metallurgists will be glad to assist you with your production problems. Write or phone your nearest J&L office.

JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH, PA.

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. basing points, in cents per pound or dollars per gross ton. Extras apply. Delivered prices do not reflect 3 pct tax on freight. (1) Mill run sheet, 10¢ per 100 lb under base; primes, 25¢ above base. (2) Unassorted commercial coating. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25¢ per 100 lb to fabricators. (8) Also shafting. For quantities of 20,000 lb to 39,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is not used. (11) Boxed. (12) This base price for annealed, bright finish wires, commercial spring wire. (13) Produced to dimensional tolerances in AISI Manual Sect. 6. (14) Billets only. (15) 9/32 in. to 47/64 in., 0.15¢ per lb higher.

Basing Points	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	10 Pacific Ports, Cars	DELIVERED TO Detroit	New York	Philadelphia
INGOTS															
Carbon, rerolling	($33.00 f. o. b. mill)														
Carbon, forging	$38	$38	$38	$38	$38	$38	$38								
Alloy	$48.69	$48.69				$48.69	(Bethlehem, Massillon, Canton, Coatesville=$48.69)								
BILLETS, BLOOMS, SLABS															
Carbon, rerolling	$39	$39	$39	$39	$39	(Provo=$50.20, Duluth=$41[14]) $39	$39	$39				$51.50[14]	$41.50		
Carbon, forging billets	$47	$47	$47	$47	$47	(Provo=$58.20, Duluth=$49[14]) $47	$47					$59.50[14]	$49.50		
Alloy	$58.43	$58.43				$58.43	(Bethlehem, Massillon, Canton=$58.43)						$60.93		
SHEET BARS	$38	$38		$38		$38	$38	$38	(Canton=$38)						
PIPE SKELP	2.05¢	2.05¢					2.05¢	2.05¢	(Coatesville=2.05¢)						
WIRE RODS [15] No. 5 to 9/32 in.	2.30¢	2.30¢		2.30¢	2.30¢	(Worcester=2.40¢)					2.585¢	2.835¢			
SHEETS															
Hot-rolled	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.875¢	2.425¢		3.01¢	2.56¢	2.685¢	2.61[5]¢
Cold-rolled [1]	3.275¢	3.275¢	3.275¢	3.275¢		3.275¢	3.275¢		3.375¢	3.275¢		3.96¢	3.41¢	3.635¢	3.635¢
Galvanized (24 gage)	4.05¢	4.05¢	4.05¢		4.05¢	4.05¢	4.05¢	4.05¢	4.50¢	4.05¢		4.635¢		4.31¢	4.24¢
Enameling (20 gage)	3.80¢	3.80¢	3.80¢	3.80¢			3.80¢		3.90¢	3.80¢		4.485¢	3.935¢	4.20¢	4.16¢
Enameling (10 Gage)	3.20¢	3.20¢	3.20¢	3.20¢			3.20¢		3.30¢	3.20¢		3.885¢	3.335¢	3.60¢	3.56¢
Long ternes [2]	4.05¢	4.05¢	4.05¢									4.835¢		4.45¢	4.41¢
STRIP															
Hot-rolled [3] 6 in. and under	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢		2.45¢			2.45¢		3.135¢	2.585¢	2.85¢	2.81¢
over 6 in.	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢		2.35¢			2.35¢		3.035¢	2.485¢	2.75¢	2.71¢
Cold-rolled [4]	3.05¢	3.15¢		3.05¢			3.05¢	(Worcester=3.25¢)					3.185¢	3.45¢	3.41¢
Cooperage stock	2.55¢	2.55¢			2.55¢		2.55¢							2.95¢	
TINPLATE															
Standard cokes, base box	$5.00	$5.00	$5.00		$5.10			$5.10	$5.10					$5.375	$5.301
Electro, box 0.25 lb	Deduct 65¢ from standard coke base box price.														
Electro, box 0.50 lb	Deduct 50¢ from standard coke base box price.														
Electro, box 0.75 lb	Deduct 35¢ from standard coke base box price.														
BLACKPLATE 29 gage [5]	3.30¢	3.30¢	3.30¢					3.40¢	3.40¢					3.67¢	3.59¢
TERNES, MFG. Special coated, base box	Deduct 70¢ from standard coke base box price.														
CAN MAKING QUALITY Blackplate 55 to 70 lb	Deduct $1.30 from standard coke base box price.														
BARS								(Duluth=2.60¢)							
Carbon steel	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	(Provo, Utah=3.20¢)			2.885¢	3.185¢	2.635¢	2.84¢	2.86¢
Rail steel [6]	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢					2.885¢	3.185¢			
Reinforcing (billet) [7]	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢			2.735¢	2.785¢	2.485¢	2.61¢	2.69¢
Reinforcing (rail) [7]	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢				2.735¢	2.785¢	2.485¢		
Cold-finished [3]	3.10¢	3.10¢	3.10¢	3.10¢		3.10¢	(Detroit=3.15¢) (Toledo=3.25¢)							3.44¢	3.46¢
Alloy, hot-rolled	2.92¢	2.92¢				2.92¢	2.92¢	(Bethlehem, Massillon, Canton=2.92¢)					3.055¢		
Alloy, cold-drawn	3.62¢	3.62¢	3.62¢	3.62¢		3.62¢							3.765¢		
PLATE								(Coatesville, Claymont=2.50¢ Geneva, Utah=2.63¢)							
Carbon steel [13]	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢		2.50¢	2.50¢			2.885¢	3.085¢	2.755¢	2.71¢	2.558¢
Floor plates	3.75¢	3.75¢									4.135¢	4.435¢		4.15¢	4.15¢
Alloy	3.79¢	3.79¢			(Coatesville=3.79¢)						4.305¢	4.525¢		4.01¢	3.995¢
SHAPES Structural	2.35¢	2.35¢	2.35¢		2.35¢	2.35¢	(Geneva, Utah=2.50¢) (Bethlehem=2.35¢)				2.735¢	3.035¢		2.54¢	2.48¢
SPRING STEEL, C-R															
0.26 to 0.50 carbon	3.05¢			3.05¢			(Worcester=3.25¢)								
0.51 to 0.75 carbon	4.65¢			4.65¢			(Worcester=4.85¢)								
0.76 to 1.00 carbon	6.65¢			6.65¢			(Worcester=6.85¢)								
1.01 to 1.25 carbon	9.03¢			9.03¢			(Worcester=9.23¢)								
WIRE [9]															
Bright [12]	3.05¢	3.05¢		3.05¢	3.05¢		(Worcester=3.15¢) (Duluth=3.10¢)				3.585¢		3.44¢	3.41¢	
Galvanized	Add proper size extra and galvanizing extra to Bright Wire Base														
Spring (high carbon)	4.00¢	4.00¢		4.00¢			(Worcester=4.10¢) (Trenton=4.25¢)				4.535¢		4.39¢	4.339¢	
PILING Steel sheet	2.65¢	2.65¢				2.65¢					3.235¢		2.99¢	3.01¢	

CORROSION AND HEAT RESISTANT STEELS

In cents per pound, f.o.b. basing point

BASING POINT	Chromium Nickel		Straight Chromium			
	No. 304	No. 302	No. 410	No. 430	No. 442	No. 448
Ingot, P'gh, Chi, Canton, Balt, Reading, Ft. Wayne, Phila.	Subject to negotiation			Subject to negotiation		
Blooms, P'gh, Chi, Canton, Phila, Reading, Ft. Wayne, Balt.	22.99	24.67	17.01	17.47	20.69	25.29
Slabs, P'gh, Chi, Canton, Balt, Phila, Reading	22.99	24.67	17.01	17.47	20.69	25.29
Billets P'gh, Chi, Canton, Watervliet, Syracuse, Balt.	Subject to negotiation			Subject to negotiation		
Billets, forging, P'gh Chi, Canton Dunkirk, Balt, Phila, Reading, Watervliet, Syracuse, Ft. Wayne, Titusville	22.99	24.67	17.01	17.47	20.69	25.29
Bars, h-r, P'gh, Chi, Canton, Dunkirk, Watervliet, Syracuse, Balt, Phila, Reading, Ft. Wayne, Titusville	27.05	25.97	20.02	20.56	24.34	29.75
Bars, c-f, P'gh, Chi, Cleve, Canton, Dunkirk, Syracuse, Balt, Phila, Reading, Ft. Wayne, Watervliet	27.05	25.97	20.02	20.56	24.34	29.75
Plates, P'gh, Middletown, Canton	31.38	29.21	23.28	23.80	28.67	33.00
Shapes, structural, P'gh, Chi	27.05	25.97	20.02	20.56	24.34	29.75
Sheets, P'gh, Chi, Middletown, Canton, Balt.	38.95	36.79	28.67	31.38	35.16	38.49
Strip, h-r, P'gh, Chi, Reading, Canton, Youngstown	25.43	23.28	18.39	18.93	25.97	37.87
Strip, c-r, P'gh, Cleve, Newark, N. J., Reading, Canton, Youngstown	32.46	30.30	23.80	24.34	34.62	56.26
Wire, c-d, Cleve, Dunkirk, Syracuse, Balt, Reading, Canton, P'gh, Newark, N. J., Phila.	27.05	25.97	20.02	20.56	24.34	29.75
Wire, flat, c-r, Cleve, Balt, Reading, Dunkirk, Canton	32.46	30.30	23.80	24.34	34.62	56.26
Rod, h-r, Syracuse	27.05	25.97	20.02	20.56	24.34	29.75
Tubing, seamless, P'gh, Chi, Canton, (4 in. to 8 in.)	72.09	72.09	.....	68.49	.....	.....

TOOL STEEL

*(F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk. *Also Canton, O.)*

An increase of 8.2 pct applies to base price and extras

	Base per lb
High speed	67¢
Straight molybdenum	54¢
Tungsten-molybdenum	57½¢
High-carbon-chromium*	43¢
Oil hardening*	24¢
Special carbon*	22¢
Extra carbon*	18¢
Regular carbon*	14¢

Warehouse prices on and east of Mississippi are 2¢ per lb higher; west of Mississippi 3¢ higher.

ELECTRICAL SHEETS

Base, all grades f.o.b. Pittsburgh

	per lb
Field grade	3.90¢
Armature	4.25¢
Electrical	4.75¢
Motor	5.425¢
Dynamo	6.125¢
Transformer 72	6.625¢
Transformer 65	7.625¢
Transformer 58	8.125¢
Transformer 52	8.925¢

F.o.b. Chicago and Gary, field grade through motor; f.o.b. Granite City, add 10¢ per 100 lb on field grade to and including dynamo. Pacific ports add 75¢ per 100 lb on all grades.

RAILS, TRACK SUPPLIES

(F.o.b. mill)

Standard rails, heavier than 60 lb	
No. 1 O.H., net ton	$43.39
Angle splice bars, 100 lb	2.85
(F.o.b. basing points)	*per net ton*
Light rails (from billets)	$49.18
Light rails (from rail steel)	49.18
	base per lb
Cut spikes	3.65¢
Screw spikes	*5.15¢
Tie plate, steel	2.55¢
Tie plates, Pacific Coast	2.70¢
Track bolts	6.50¢
Track bolts, heat treated, to railroads	6.75¢
Track bolts, jobbers discount	63-5

*Plus 12 pct.

Basing points, light rails, Pittsburgh, Chicago, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond, Oregon and Washington ports, add 25¢.

ROOFING TERNEPLATE

(F.o.b. Pittsburgh, 112 sheets)

	20x14 in.	20x28 in.
8-lb coating I.C.	$8.50	$17.00
15-lb coating I.C.	9.50	19.00
20-lb coating I.C.	10.00	20.00

CLAD STEEL

Base prices, cents per pound

	Plate	Sheet
Stainless-clad		
No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Pa.	21.00*	22.00
Nickel-clad		
10 pct, f.o.b. Coatesville, Pa.	18.72	....
Inconel-clad		
10 pct, f.o.b. Coatesville	26.00	....
Monel-clad		
10 pct, f.o.b. Coatesville	24.96	....
Aluminized steel		
Hot dip, 20 gage, f.o.b. Pittsburgh	....	9.00

*Includes annealing and pickling.

WIRE PRODUCTS

To the dealer, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Basing Points Named	Pacific Coast Basing Points†
	base per keg	
Standard wire nails	$3.75	$4.25
Coated nails	3.75	4.25
Cut nails, carloads	4.85	....
	base per 100 lb	
Annealed fence wire	$3.50	$4.00
Annealed galv. fence wire	3.85	4.35
	base column	
Woven wire fence*	72	90
Fence posts, carloads	74	91
Single loop bale ties††	72	97
Galvanized barbed wire**	79	89
Twisted barbless wire	79	89

*15½ gage and heavier. **On 80-rod spools in carload quantities.

†Prices subject to switching or transportation charges.

††Add 50c a ton.

HIGH TENSILE, LOW ALLOY STEELS

base prices, cents per pound

Steel	Aldecor	Corten	Double Strength No. 1	Dynalloy	HI Steel	Mayari R	Otis-coloy	Yoloy	Y-50
Producer	Republic	Carnegie-Illinois, Republic	Republic	Alan Wood	Inland	Bethlehem	Jones & Laughlin	Youngstown Sheet & Tube	American Rolling Mill
Plates	3.45	3.45	3.45	3.45	3.45	3.45	3.45	3.45	.....
Sheets									
Hot-rolled	3.575	3.575	3.575	3.575	3.575	3.575	3.575	3.575	.....
Cold-rolled	4.525	4.525	4.525	.....	4.525	4.525	4.525	4.525	5.225*
Galvanized	.....	.....	.....	.....	.....	5.50	.....	.....	.....
Strip									
Hot-rolled									
Over 6-in.	3.60	3.60	3.60	.....	3.60	3.60	3.60	3.60	.....
6-in & under	3.70	3.70	3.70	.....	3.70	3.70	3.70	3.70	.....
Cold-rolled	4.30	.....	4.30	.....	4.40	.....	4.30	4.30	5.00*
Commodity	.....	.....	.....	.....	.....	.....	4.45	.....	.....
Shapes	.....	3.45	.....	.....	3.45	3.45	3.45	3.45	.....
Beams	.....	3.45	.....	.....	.....	3.45	.....	.....	.....
Bars									
Hot-rolled	3.70	3.70	3.70	.....	.....	3.70	3.70	3.732†‡	.....
Cold rolled	.....	.....	.....	.....	.....	.....	.....	4.382†‡	.....
Bar shapes	.....	3.85	.....	.....	3.85	3.85	3.85	3.85	.....
Billets, blooms, slabs (per gross ton)									
Structural	.....	.....	.....	.....	.....	.....	.....	$74.65†	.....
Forging	.....	.....	.....	.....	.....	.....	.....	$82.23†	.....

* 21 gage and lighter. † Alloy extras apply. ‡ Add 0.379¢ for forging or heat treating grade.

WELDED PIPE AND TUBING

Base discounts, f.o.b. Pittsburgh district and Lorain, Ohio, mills

(F.o.b. Pittsburgh only on wrought pipe)
Base price—$200.00 per net ton

Steel (buttweld)

	Black	Galv.
⅛-in.	60½	48
¼-in.	63½	52
1-in. to 3-in.	65½	54½

Wrought Iron (buttweld)

⅛-in.	17⅞	+4⅝
¼-in.	24½	2⅝
1-in. and 1¼-in.	28⅝	9⅞
1½-in.	33	11⅞
2-in.	32⅝	11⅝

Steel (lapweld)

2-in.	58	46½
2½-in. and 3-in.	61	49½
3½-in. to 6-in.	63	51½

Wrought Iron (lapweld)

2-in.	24⅞	4⅞
2½-in. to 3½-in.	25⅞	7½
4-in.	28⅛	11⅝
4½-in. to 8-in.	27	10¼

Steel (butt, extra strong, plain ends)

⅛-in.	58½	47½
¼-in.	62½	51½
1-in. to 3-in.	64	54

Wrought Iron (same as above)

⅛-in.	18⅞	+1⅝
¼-in.	25⅝	4¾
1-in. to 2-in.	33	13

Steel (lap, extra strong, plain ends)

2-in.	56	45½
2½-in. and 3-in.	60	49½
3½-in. to 6-in.	63½	53

Wrought Iron (same as above)

2-in.	28½	8⅝
2½-in. to 4-in.	34	16¼
4½-in. to 6-in.	32⅝	14⅝

On buttweld and lapweld steel pipe jobbers are granted a discount of 5 pct. On l.c.l. shipments prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lapweld and one point lower discount, or $2 a ton higher on all buttweld.

BOILER TUBES

Seamless steel and lapweld commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft f.o.b. Pittsburgh, in carload lots

	Seamless Cold-Drawn	Seamless Hot-Rolled	Lapweld, Hot-Rolled
2 in. O.D. 13 B.W.G.	16.52	13.90	13.20
2½ in. O.D. 12 B.W.G.	22.21	18.70	17.67
3 in. O.D. 12 B.W.G.	24.71	20.79	19.56
3½ in. O.D. 11 B.W.G.	31.18	26.25	24.68
4 in. O.D. 10 B.W.G.	38.68	32.56	30.55

(Extras for less carload quantities)

40,000 lb or ft and over.....Base
30,000 lb or ft to 39,999 lb or ft.... 5 pct
20,000 lb or ft to 29,999 lb or ft....10 pct
10,000 lb or ft to 19,999 lb or ft....20 pct
5,000 lb or ft to 9,999 lb or ft....30 pct
2,000 lb or ft to 4,999 lb or ft....45 pct
Under 2,000 lb or ft.....65 pct

CAST IRON WATER PIPE

Per net ton

6-in. to 24-in., del'd Chicago.....$70.33
6-in. to 24-in., del'd New York.... 69.60
6-in. to 24-in., Birmingham..... 61.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles or Seattle for all rail shipment; rail and water shipment less 34.40

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

An increase of 12 pct applies to listings except Large Rivets

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

Base discount less case lots

Percent Off List

½ in. & smaller x 6 in. & shorter...65½
9/16 & ⅝ in. x 6 in. & shorter.....63½
¾ to 1 in. x 6 in. & shorter.....61
1⅛ in. and larger, all lengths.....59
All diameters over 6 in. long.....59
Lag, all sizes 62
Plow bolts 65

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

⅛ in. and smaller 62
9/16 to 1 in. inclusive.....59
1⅛ to 1½ in. inclusive.....57
1⅝ in. and larger 56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifin. Hexagon Nuts	U.S.S.	S.A.E.
Base discount less keg lots		
7/16 in. and smaller	..	64
½ in. and smaller.....	62	..
⅛ in. through 1 in.....	..	60
9/16 in. through 1 in.....	59	..
1⅛ in. through 1½ in....	57	58
1⅝ in. and larger	56	..

In full keg lots, 10 pct additional discount. For 200 lb or more, freight allowed up to 50¢ per 100 lb, based on Cleveland, Chicago, Pittsburgh.

Stove Bolts

Consumer

Packages, nuts loose .....71 and 10
In packages 71
In bulk 80

On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.

Large Rivets
(½ in. and larger)

Base per 100 Lb

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham $4.75
F.o.b. Lebanon, Pa. 4.90

Small Rivets
(7/16 in. and smaller)

Percent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham .....65 and 5

Cap and Set Screws *(In packages)*	*Percent Off List* *Consumer*
Upset full fin, hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.....	64
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes.....	36
Fillister head cap, listed sizes.....	51

Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.

FLUORSPAR

Maximum price f.o.b. consumer's plant, $30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

Effective CaF_2 Content:	*Base price per short ton*
70% or more $33.00	
65% but less than 70%.....	32.00
60% but less than 65%.....	31.00
Less than 60%	30.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

Per Gross Ton

Old range, bessemer $5.45
Old range, non-bessemer 5.30
Mesaba, bessemer 5.20
Mesaba, non-bessemer 5.05
High phosphorus 5.05

Prices are for ore shipped on and after June 24, 1946, and for ore covered by adjustable pricing agreements authorized by Order No. 8, RMPR 113.

These prices do not reflect the recent ICC increase in freight rates.

METAL POWDERS

Prices in cents per pound in ton lots, f.o.b. shipping point.

Brass, minus 100 mesh..19¼¢ to 21½¢
Copper, electrolytic, 100 and 375 mesh .....23½¢ to 27½¢
Copper, reduced, 150 and 200 mesh ..... 23¾¢
Iron, commercial, 100, 200, 325, mesh 96 + % Fe.....11¢ to 16¢
Swedish sponge iron, 100 mesh, c.l.f. N. Y., carlots, ocean bags....7.4¢ to 8¢
Iron, crushed, 200 mesh and finer, 90 + % Fe carload lots..... 4¢
Iron, hydrogen reduced, 300 mesh and finer, 98 + % Fe, drum lots ..... 63¢
Iron, electrolytic, unannealed, 325 mesh and coarser, 99 + % Fe.25¢ to 31¢
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe ..... 17¢
Iron carbonyl, 300 mesh and finer, 98-99.8 + % Fe .....90¢ to $1.75
Aluminum, 100, 200 mesh, carlots 25¢
Antimony, 100 mesh ..... 30¢
Cadmium, 100 mesh $1.75
Chromium, 100 mesh and finer..... $1.25
Lead, 100, 200 & 300 mesh.13¼¢ to 16¾¢
Manganese, minus 325 mesh and coarser .....44¢ to 61¢
Nickel, 150 mesh ..... 51½¢
Silicon, minus 325 mesh and coarser .....26¢ to 55¢
Solder powder, 100 mesh..8½¢ plus metal
Tin, 100 mesh ..... 58¾¢
Tungsten metal powder, 98%-99%, any quantity, per lb..... $2.60
Molybdenum powder, 99%, in 100-lb kegs, f.o.b. York, Pa., per lb.. $2.65
Under 100 lb..... $2.90

COKE

Furnace, beehive (f.o.b. oven)	Net Ton
Connellsville, Pa.	$8.75
Connellsville, Pa., hand drawn.	9.35
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	8.50
Foundry, Byproduct	
Chicago, del'd	15.10
Chicago, f.o.b.	14.35
New England, del'd	16.04
Kearny, N. J., f.o.b.	14.40
Philadelphia, del'd	14.63
Buffalo, del'd	14.75
Portsmouth, Ohio, f.o.b.	12.85
Painesville, Ohio, f.o.b.	13.50
Erie, del'd	14.50
Cleveland, del'd	14.55
Cincinnati, del'd	14.60
St. Louis, del'd	15.10†
Birmingham, del'd	12.35

†Except producers situated in states other than Missouri, Alabama or Tennessee, sellers may charge a maximum delivered price of $15.60 in the St. Louis Mo., and East St. Louis, Ill., switching districts.

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

Carloads Per 1000

Super-duty brick, St. Louis.....$81.00
First quality, Pa., Md., Ky., Mo., Ill., Ohio 65.00
First quality, New Jersey 70.00
Sec. quality, Pa., Md., Ky., Mo., Ill. 59.00
Sec. quality, New Jesey 62.00
Sec. quality, Ohio 57.00
Ground fire clay, net ton, bulk..... 9.50

Silica Brick

Pennsylvania and Birmingham ...$65.00
Chicago District 74.00
Silica cement, net ton (Eastern)... 11.50
Chicago 12.50

Chrome Brick *Per Net Ton*

Standard chemically bonded, Balt., Plymouth Meeting, Chester $54.00

Magnesite Brick

Standard, Balt. and Chester $76.00
Chemically bonded, Baltimore 65.00

Grain Magnesite

Domestic, f.o.b. Balt. and Chester in sacks $44.50
Domestic, f.o.b. Chewelah, Wash., in bulk 22.00
in sacks 26.00
Clinker (dead burned) dolomite, bulk, per net ton, f.o.b. York, Pa. 10.05
Midwest, add 10¢; Mo. Valley, add 20¢

WAREHOUSE PRICES

Delivered metropolitan areas, per 100 lb.

Cities	SHEETS			STRIP			Plates ¼ in. and heavier	Structural Shapes	BARS		ALLOY BARS			
				Hot-Rolled										
	Hot-Rolled (10 gage)	Cold-Rolled	Galvanized (24 gage)	6 in. and Under	Over 6 in.	Cold-Rolled			Hot-Rolled	Cold-Finished	Hot-Rolled, A-8617-20	Hot-Rolled, A-8742-50 Ann.	Cold-Drawn, A-8617-20	Cold-Drawn, A-8742-50 Ann.
**Philadelphia	$3.774	$5.139	$5.249*	$4.314	$4.214	$5.064	$3.875	$3.937	$4.114	$4.564	$6.287	$7.387	$7.664	$8.764
New York	3.856	4.869	5.501	4.375	4.275	5.075	4.049	4.038	4.134	4.584	6.338	7.438	7.684	8.784
Boston	4.05	5.031	5.725	4.518	4.418	4.985	4.203	4.023	4.356	4.656	6.503	7.603	7.756	8.856
Baltimore	3.64	5.118	5.365	4.293	4.193	....	3.865	4.05	4.093	4.543	....	....	....	....
Norfolk	4.037	....	5.862	4.577	4.477	....	4.262	4.303	4.377	4.677	....	....	....	....
Chicago	3.475	4.425	5.40	3.95	3.85	4.90[6]	3.80	....	3.75	4.20	6.05	7.15	7.20	8.30
Milwaukee	3.633	4.583	5.558	4.108	4.008	5.058[6]	3.958	3.958	3.908	4.358	6.308	7.408	7.458	8.558
Cleveland	3.575	....	5.347	3.95	3.85	....	3.85	3.88	3.60	4.20	6.277	7.377	7.20	8.30
Buffalo	3.575	4.625	5.20	4.211	4.111	4.961	3.921	3.65	3.60	4.20	6.05	7.15	7.20	8.30
Detroit	3.71	4.76	5.526	4.085	3.985	4.95	3.935	3.987	3.735	4.285	6.456	7.556	7.585	8.685
Cincinnati	3.671	4.721	5.296	4.046	3.946	5.002	3.952	3.983	3.902	4.502	6.441	7.541	7.602	8.702
St. Louis	3.643	4.593	5.622	4.118	4.018	5.222	3.968	3.968	3.918	4.522	6.472	7.572	7.622	8.722
Pittsburgh	3.575	4.625	5.20	3.95	3.85	4.70	3.65	3.65	3.60	4.20	6.05	7.15	7.20	8.30
St. Paul	3.817	4.767	5.666	4.292	4.192	5.000	4.142	4.142	4.092	4.852	....	6.322	7.952	8.052
Duluth	3.817	4.767	5.666	4.292	4.192	....	4.142	4.142	4.092	....	6.472	6.572	....	....
Omaha	4.045	5.72	6.00	4.52	4.42	....	4.37	4.37	4.32	4.945	....	....	....	....
Indianapolis	3.775	4.825	5.40	4.15	4.05	5.03	3.92	3.92	3.87	4.47	6.17	....	7.32	....
Birmingham	3.675	....	5.20	4.05	3.95	....	3.80	3.80	3.75	4.954	6.414	7.514	7.564	8.614
Memphis	4.221	....	5.746	4.596	4.496	....	4.346	4.346	4.296	4.821	....	....	....	....
New Orleans	4.359*	5.40[1]	5.884	4.734	4.634	....	4.484	4.484*	4.434*	5.175	....	....	....	....
Los Angeles	4.885	6.635[1]	6.585	5.335	5.235	....	4.835	4.735	4.685	6.065	....	....	....	....
San Francisco	4.435	6.035	6.585	4.885	4.785	....	4.535	4.385	4.435	5.815	....	....	....	....
Seattle	4.905[5]	7.305[2]	6.435	4.635	4.535	....	5.035[5]	4.735[5]	4.635[5]	6.265	7.735[5]	8.735[5]	....	9.585[5]
Portland	4.905[4]	....	6.235	5.135	....	....	5.035[4]	4.735[4]	4.735[4]	6.015	7.735	8.885	....	....
Salt Lake City	4.81	....	6.70	5.94	5.84	....	5.29	5.29	5.19	6.49	....	....	....	....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED: Sheets, 400 to 1999 lb; strip, extras on all quantities; bars, 1500 lb base.

ALLOY BARS: 1000 to 39,999 lb.

GALVANIZED SHEETS: 450 to 1499 lb.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 450 to 3749 lb; (4) 300 to 4999 lb; (5) 300 to 10,000 lb; (6) 2000 lb and over; (7) 3500 lb and over; (8) 1000 lb and over.

(*) Philadelphia: Galvanized sheet, 25 or more bundles.

Extra for size, quality, etc., apply on above quotations.

* Add 29.1¢ for sizes not rolled in Birmingham.

** City of Philadelphia only. Applicable freight rates must be added to basing point prices to obtain delivered price to other localities in metropolitan area.

PIG IRON PRICES

Per gross ton, retroactive to May 29.

BASING POINT PRICES						DELIVERED PRICES (BASE GRADES)						
Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.	Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	29.00	29.50	30.00	30.50	.....	Boston	Everett	$0.50 Arb.	29.50	30.00	30.50	31.00	.....
Birdsboro	29.00	29.50	30.00	30.50	34.00	Boston	Birdsboro-Steelton	4.47	.....	.....	.....	.....	38.47
Birmingham	23.50*	24.88*	.....	29.50	.....	Brooklyn	Bethlehem	2.78	31.78	32.28	32.78	33.28	.....
Buffalo	27.50	28.50	29.00	29.50	34.00	Brooklyn	Birdsboro	3.26	.....	.....	.....	.....	37.26
Chicago	28.00	28.50	28.50	29.00	.....	Canton	Clev.-Ygstn, Sharpsvil.	1.54	29.54	30.04	30.04	30.54	.....
Cleveland	28.00	28.50	28.50	29.00	.....	Canton	Buffalo	3.55	.....	.....	.....	.....	37.55
Detroit	28.00	28.50	28.50	29.00	.....	Cincinnati	Birmingham	4.30	27.80*	29.18*	.....	.....	.....
Duluth	28.50	29.00	29.00	29.50	.....	Cincinnati	Hamilton	1.24	.....	.....	29.74	.....	.....
Erie	28.00	28.50	29.00	29.50	.....	Cincinnati	Buffalo	4.89	.....	.....	.....	.....	38.89
Everett	29.00	29.50	30.00	30.50	.....	Jersey City	Bethlehem	1.70	30.70	31.20	31.70	32.20	.....
Granite City	28.00	28.50	28.50	29.00	.....	Jersey City	Birdsboro	2.16	.....	.....	.....	.....	38.16
Hamilton	28.00	28.50	28.50	.....	.....	Los Angeles	Provo	5.25	31.25	31.75	.....	.....	.....
Neville Island	28.00	28.50	28.50	29.00	.....	Los Angeles	Buffalo	16.33	.....	.....	.....	.....	50.33
Provo	26.00	26.50	.....	.....	.....	Mansfield	Cleveland-Toledo	2.16	30.16	30.66	30.66	31.16	.....
Sharpsville	28.00	28.50	28.50	29.00	.....	Mansfield	Buffalo	3.74	.....	.....	.....	.....	37.74
Sparrows Point	29.00	29.50	.....	.....	.....	Philadelphia	Swedeland	0.93	29.93	30.43	30.93	31.43	.....
Steelton	29.00	.....	.....	.....	34.00	Philadelphia	Birdsboro	1.38	.....	.....	.....	.....	35.38
Swedeland	29.00	29.50	30.00	30.50	.....	San Francisco	Provo	5.25	31.25	31.75	.....	.....	.....
Toledo	28.00	28.50	28.50	29.00	.....	San Francisco	Buffalo	16.33	.....	.....	.....	.....	50.33
Youngstown[3]	28.00	28.50	28.50	29.00	.....	Seattle	Provo	5.25	31.25	31.75	.....	.....	.....
						Seattle	Buffalo	16.33	.....	.....	.....	.....	50.33
						St. Louis	Granite City	0.50 Arb.	28.50	29.00	29.00	29.50	.....
						St. Louis	Buffalo	7.86	.....	.....	.....	.....	41.86

* Republic Steel Corp. charges $2 more on basic and foundry pig iron produced at Birmingham.

(1) Struthers Iron & Steel Co., Struthers, Ohio, charges 50¢ per ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

Charcoal pig iron base prices for Lyles, Tenn., and Lake Superior furnaces, $33.00 and $34.00, respectively. Newberry Brand of Lake Superior charcoal iron $39.00 per g.t., f.o.b. furnace. Delivered to Chicago, $42.34. High phosphorus iron sells at Lyles, Tenn., at $28.50.

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorous content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron, silicon 6.00 to 6.50 pct, C/L per g.t., f.o.b. Jackson, Ohio—$48.00; f.o.b. Buffalo—$49.25. Add $1.00 per ton for each additional 0.50 pct Si. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for prices of comparable analysis.

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size, f.o.b. Baltimore, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn.

Carload lots (bulk)	$135.00
Less ton lots (packed)	148.50
F.o.b. Pittsburgh	139.50

$1.70 for each 1% above 82% Mn; penalty, $1.70 for each 1% below 78%.

Briquets—cents per pound of briquet, freight allowed, 66% contained Mn.

	Eastern	Central	Western
Carload, bulk	6.05	6.30	6.60
Ton lots	6.65	7.55	8.55
Less ton lots	6.80	7.80	8.80

Spiegeleisen

Contract prices, gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Carloads	$39.00	$40.00
F.o.b. Pittsburgh, Chicago	40.00	

Manganese Metal

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed, eastern zone.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, bulk	30
L.c.l. lots	32

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	32
Ton lots	34
Less ton lots	36

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, f.o.b. shipping point, freight allowed, eastern zone.

	Carloads	Ton	Less
0.10% max. C, 0.06% P, 90% Mn	21.00	21.40	21.65
0.10% max. C	20.50	20.90	21.15
0.15% max. C	20.00	20.40	20.65
0.30% max. C	19.50	19.90	20.15
0.50% max. C	19.00	19.40	19.65
0.75% max. C, 7.00% max. Si	16.00	16.40	16.65

Silicomanganese

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed. 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk	6.05
Ton lots	6.70
Briquet, contract basis, carlots, bulk freight allowed, per lb of briquet.	5.80
Ton lots	6.30
Less ton lots	6.55

Silvery Iron (electric furnace)

Si 14.01 to 14.50%, $53.25 f.o.b. Keokuk, Iowa; $50.00 f.o.b. Jackson, Ohio; $51.25 f.o.b. Niagara Falls. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 per ton for low impurities, not to exceed: P—0.05%, S—0.04%, C—1.00%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, f.o.b. shipping point, freight allowed, for ton lots, packed.

	Eastern	Central	Western
96% Si, 2% Fe	13.10	13.55	16.50
97% Si, 1% Fe	13.45	13.90	16.80

Ferrosilicon Briquets

Contract price, cents per pound of briquet, bulk, f.o.b. shipping point, freight allowed to destination, 40% Si.

	Eastern	Central	Western
Carload, bulk	3.60	3.75	3.90
Ton lots	4.15	4.55	4.60
Less ton lots	4.40	4.80	4.85

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
50% Si	7.05	7.50	7.65
75% Si	8.55	8.70	9.25
80-90% Si	9.50	9.65	10.15
90-95% Si	11.80	11.95	12.40

Ferrochrome

(65-72% *Cr*, 2% *max. Si*)

Contract prices, cents per pound, contained Cr, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
0.06% C	23.00	23.40	24.00
0.10% C	22.50	22.90	23.50
0.15% C	22.00	22.40	23.00
0.20% C	21.50	21.90	22.50
0.50% C	21.00	21.40	22.00
1.00% C	20.50	20.90	21.50
2.00% C	19.50	19.90	20.50
66-71% Cr, 4-10% C	14.50	14.90	15.00
62-66% Cr, 5-7% C	15.05	15.45	15.55

Briquets — contract price, cents per pound of briquet, f.o.b. shipping point, freight allowed, 60% chromium.

	Eastern	Central	Western
Carload, bulk	9.20	9.50	9.90
Ton lots	9.80	10.30	11.80
Less ton lots	10.10	10.60	12.10

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low-carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N. High-carbon type: 66.71% Cr, 4-5% C, 0.75% N. Add 5¢ per lb to regular high-carbon ferrochrome price schedule.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, f.o.b. shipping point, freight allowed.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

	Eastern	Central	Western
Carload	15.60	16.00	16.10
Ton lots	16.65	17.30	18.50
Less ton lots	17.30	17.95	19.15

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

	Eastern	Central	Western
Carload	20.00	20.40	21.00
Ton lots	21.00	21.65	22.85
Less ton lots	22.00	22.65	23.85

Chromium Metal

Contract prices, cents per lb, chromium contained, carload, f.o.b. shipping point, freight allowed. 97% min. Cr, 1% max. Fe.

	Eastern	Central	Western
0.20% max. C	83.50	85.00	86.25
0.50% max. C	79.50	81.00	82.25
9.00% min. C	79.50	81.00	82.25

Chromium—Copper

Contract price, cents per pound of alloy, f.o.b. Niagara Falls, freight allowed east of the Mississippi. 8-11% Cr, 88-90% Cu, 1.00% max. Fe, 0.50% max. Si.

Shot or ingot	45¢

Calcium—Silicon

Contract price per lb of alloy, lump, f.o.b. shipping point, freight allowed.

30-35% Ca, 60-65% Si, 3.00% max. Fe or 28-32% Ca, 60-65% Si, 6.00% max. Fe.

	Eastern	Central	Western
Carloads	13.00	13.50	15.55
Ton lots	14.50	15.25	17.40
Less ton lots	15.50	16.25	18.40

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, f.o.b. shipping point, freight allowed.

16-20% Ca, 14-18% Mn, 53-59% Si.

	Eastern	Central	Western
Carloads	15.50	16.00	18.05
Ton lots	16.50	17.35	19.10
Less ton lots	17.00	17.85	19.60

Calcium Metal

Eastern zone contract prices, cents per pound of metal, f.o.b. shipping point, freight allowed. Add 1¢ for central zone; 5¢ for western zone.

	Cast	Turnings	Distilled
Ton lots	$1.35	$1.75	$4.25
Less ton lots	1.60	2.00	5.00

CMSZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

	Eastern	Central	Western
Ton lots	12.00	12.75	14.75
Less ton lots	12.50	13.25	15.25

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

	Eastern	Central	Western
Ton lots	11.75	12.50	14.50
Less ton lots	12.25	13.00	15.00

SMZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed. 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe.

	Eastern	Central	Western
Ton lots	12.00	12.85	14.60
Less ton lots	12.50	13.35	15.10

Other Ferroalloys

Ferrotungsten, standard, lump or ¼ X down, packed, f.o.b. plant Niagara Falls, Washington, Pa., York, Pa., per pound contained T, 5 ton lots, freight allowed	$1.88
Ferrovanadium, 35-55%, contract basis, f.o.b. plant, freight allowances, per pound contained V.	
Openhearth	$2.70
Crucible	$2.80
High speed steel (Primos)	$2.90
Vanadium pentoxide, 88-92% V_2O_5 technical grade, contract basis, per pound contained V_2O_5	$1.10
Ferrocolumbium, 50-60%, contract basis, f.o.b. plant, freight allowed, per pound contained Cb.	
Ton lots	$2.25
Less ton lots	$2.30
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo	95¢
Calcium molybdate, 40-45%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo	80¢
Molybdenum oxide briquets, 48-52% Mo, f.o.b. Langeloth, Pa., per pound contained Mo	80¢
Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo	80¢
Ferrotitanium, 40-45%, 0.10%C max., f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti	$1.23
Less ton lots	$1.25
Ferrotitanium, 20-25%, 0.10%C max., ton lots, per pound contained Ti	$1.35
Less ton lots	$1.40
High-carbon ferrotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads	$142.50
Ferrophosphorus, 18%, electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with $3 unitage freight equalled with Rockdale, Tenn., per gross ton	$58.50
Ferrophosphorus, Electrolytic, 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage freight equalized with Nashville, per gross ton	$75.00
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Carload lots	14¢
Zirconium, 12-15%, contract basis, lump, f.o.b. plant, freight allowed, per pound of alloy	
Carload, bulk	4.60¢
Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Niagara Falls, carload	6.25¢
Ton lots	6.75¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Car lots	8.50¢
Ton lots	9.25¢
Less ton lots	9.75¢

Boron Agents

Contract prices per pound of alloy, f.o.b. shipping point, freight allowed. Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

	Eastern	Central	Western
Less ton lots	$1.30	$1.3075	$1.329

Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.

Ton lots	$1.89	$1.903	$1.935
Less ton lots	2.01	2.023	2.055

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

Less ton lots	$2.10	$2.1125	$2.1445

Silcaz No. 3, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
carload lots	25¢
Ton lots	26¢
Silvaz No. 3, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Carload lots	58¢
Ton lots	59¢
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 50 lb and over.	
No. 1	87.5¢
No. 6	60¢
No. 79	45¢
Bortram, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢

Uneven Labor Supply Poses Problem for Keystone State

By T. E. LLOYD
Pittsburgh Regional Editor

o o o

Pittsburgh

• • • **Uneven distribution** of worker supply looms as the major labor-market problem, according to the Pennsylvania U. S. Employment Service. General overall labor surplus continues, but a statewide review of the labor supply-demand relationships shows that worker surpluses are becoming more concentrated in specific areas. Other sections are showing increasing shortages.

A summary of the current situation indicates: (1) Depletion of women reserves in many sections. (2) The approach of residual levels for male labor in some cities. (3) Increasing unemployment in surplus areas. (4) Widespread shortages for specific occupations.

Women employment in Pennsylvania in October 1946 totalled 1,100,000, as compared with 1,300,000 in August 1945. This decline was accompanied by a drop in the percentage of women among the unemployed, from 22 to 11 pct. These factors, resulting from large-scale removal of women from work and the entry of veterans into the labor market, have brought about the current disparity between women labor supply and demand.

The areas where the female labor shortages are most pronounced are: Erie, Reading, Allentown-Bethlehem, Lancaster, Gettysburg, Harrisburg, Chambersburg, and York-Hanover. Philadelphia and its peripheral area, though not now acute, report signs of developing stringency. The shortage is most apparent in the southeastern section of the state, where the greatest concentration of plants is in the apparel, leather and shoe, tobacco, and light manufacture assembly industries.

Areas of heavy labor surplus coincide close to those areas which even during the war were considered labor-supply sections. Chief among these is the anthracite section. Reports from Scranton-Wilkes-Barre area show a total of 50,000 unemployed job seekers. Pottsville reports 15,000 workers idle; Altoona-Johnstown reports 17,000 unemployed and the Sharon-New Castle area has a large pool of job seekers. These areas report steady out-migration of population, but not sufficient to afford any relief.

Despite the geographical unbalance in employment trends, the overall employment situation in Pennsylvania continues optimistic. Almost all reports show signs of general improvement. A comparison of industry line employment totals in October 1946 to October 1945 shows: construction, up 47 pct; stone, clay and glass, up 26 pct; mining, up 25 pct; iron and steel, up 13 pct; and trade and service, up 12 pct.

Statewide unemployment claims benefit reports also reflect the improvement. In October, 250,000 jobless persons were filing for benefits, as compared with 267,000 in September, 315,000 in August, 486,000 in May, and 455,000 in March. The October reports, further, were inflated by the Pittsburgh power strike which affected over 100,000 workers in the area. Without this condition, the current figure would be 50 pct less than 6 months ago.

Another indication of improving conditions is the United States Employment Service report that in Pennsylvania, 72 pct of all discharged veterans have found employment, a sharp gain from the 58 pct recorded six months ago.

26 Pct Are Vets

Pittsburgh

• • • **World War II veterans employed in 155 Pittsburgh area manufacturing concerns increased about 1.3 pct from July to September, according to the local U. S. Employment Service. Veterans accounted for about 26.1 pct of all workers and 29.4 pct of the male workers in these plants during October.**

An increase of World War II veterans was noted also in non-manufacturing establishments, where the rate of veterans to total employment increased from 12.8 pct in July to 13.1 pct in September. The ratio of veterans to total male employment increased from 22.7 to 23.4 pct during the same period.

The other side of the veterans' employment picture was also noted, when the USES stated that veterans represented over 73 pct of all work applications of men on file in the local USES office. Three out of every four unemployed men in the area are veterans.

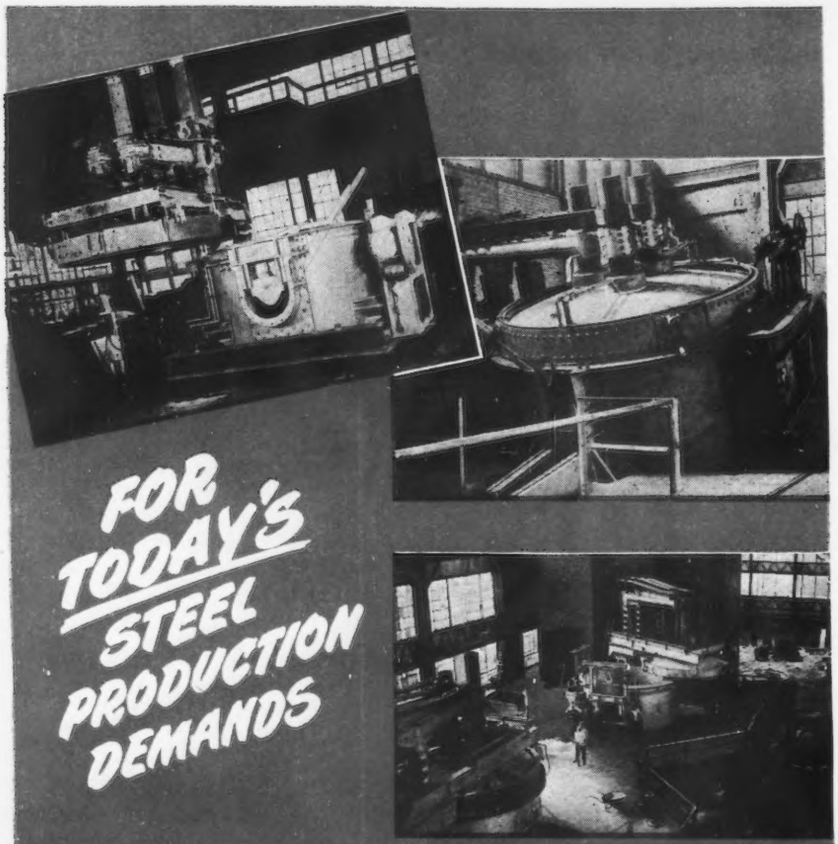
Labor Shortage Looms In Steel City; Strike Hit 75,000 Workers

Pittsburgh

• • • **The shortage** of electric power and the paralysis of street railway transportation caused by the Pittsburgh power strike resulted in the temporary unemployment of more than 75,000 workers in the area, according to the local U. S. Employment Service. Major iron and steel producers were able to maintain full production and employment through the use of their own power sources.

Unemployment compensation and veterans claims were filed by 55,600 workers as a direct result of the power strike during the four weeks ended Oct. 24. This estimate was based on the increase in new claims filed during that period over the number filed during a "normal" four weeks' period, an increase from 9700 to 65,300. Claimants included about 12,500 women and 11,500 World War II veterans.

In the area, employment continues its upward trend, with 155 major manufacturing establishments reporting an employment rise of 3200 or 1.7 pct to an approximate 200,000 total. Employment in non-manufacturing concerns increased 1.9 pct, based on 65 firms in this group. Increased employment was especially noted in such industries as: Iron and steel, transportation equipment manufacturing, nonferrous metals and products, machinery, con-



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PITTSBURGH 30, PENNA.

struction, coal mining, and other of the heavier type industries.

Occupational shortages in the Pittsburgh district have developed in service and retail merchandise establishments. Machinists, structural steel fitters and layout men, sheet metal workers, pattern makers and auto mechanics are also in short supply. Graduate engineers and draftsmen are not available to fill current openings.

USES clearance activity increased about 200 pct in September, indicating that the labor supply of this area is leaving the district for out-of-state jobs. Two steel plants in Ohio and food processing plants in New York and New Jersey have successfully recruited more than 2000 workers in the area. The number of workers recruited was limited, apparently, only by the availability of housing at the plant sites.

In Allegheny County, 9018 applicants for Unemployment Benefits or Servicemen's Readjustment Allowances were disqualified in the first nine months of 1946. Reasons for such action included refusal of suitable work by claimants, leaving employment without good cause, and similar actions.

Record Output Revives Old Steel Mill Custom

McKeesport, Pa.

• • • **Reviving an** almost forgotten steel mill tradition, a new broom fanned the breeze atop a flagpole at National works of U. S. Steel's National Tube Co., symbolic of a "clean sweep" last month in the plant's production records. And the boss has ordered smokes for everyone, another old custom among steelmakers who smash records.

Bristles skyward, the new broom is aloft to serve public notice that the plant's 6500 employees achieved all-time highs in basic steel production and seamless steel pipe manufacture in October.

Even record war production figures were surpassed in the accelerated peacetime pace at the plant. The records made were:

(1) Ingots—104,246 tons; old record, 103,349 tons, in September, 1944.

(2) Blooming mills—84,305 tons; old record, 83,287 tons, January, 1943.

(3) Seamless pipe mills—50,146

(Advertisement)

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sees many

GOOD THINGS AHEAD

It is reported that . . . . . .

A. O. Smith's new plant at Kankakee will have the largest radiant heating plant on record. Water, heated to 140 deg. by 120 separate heaters will circulate through 40 miles of pipe laid in the floor slab.

get ready with CONE for tomorrow

The making of acetylene from natural gas is being studied and reports may be expected from the Department of Commerce.

get ready with CONE for tomorrow

Muncie Gear Works proposes to market a "reverse cycle" heating plant this year.

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Truck bodies of magnesium are being made by Barry and Bailey Co. of Philadelphia.

get ready with CONE for tomorrow

Blue Mountain Clay Co. of Memphis makes a new oil, grease and water absorbent for oily and wet floors that is said to absorb 120% to 140% of its weight.

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The Public Health Service announces that satisfactory substitutes for mercury have been found that end the hazard of mercury poisoning (the origin of the term "mad hatter") in the hat making industry.

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In a new thickness gage, designed by Glenn L. Martin Co., a dial registers the deflection of a sheet of metal when a predetermined vacuum is created on one side of it.

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The idea of the variable pitch propeller has been applied to industrial fans by Evans Products Co. Operated by a built-in thermostat, it maintains constant engine operating temperature.

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An electrically conductive, nonsparking linoleum has been introduced by Congoleum-Nairn.

General Electric has patented a new type of household refrigerator which maintains temperature at two levels simultaneously.

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The Bureau of Mines has recently released information on its process for the electrolytic method of producing manganese.

get ready with CONE for tomorrow

Pullman-Standard has increased its output of car wheels ten times by using a machine which revolves the tool instead of the wheel.

get ready with CONE for tomorrow

National Tube Co. claims that its new plant at Lorain, Ohio, is the world's first straight-line seamless pipe mill. It produces 2,000 feet of seamless steel pipe per minute.

The Office of Technical Services of the U. S. Dept. of Commerce reports on a silver-magnesium solder that can withstand the heat of gas turbines.

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"Multi-tule", a profile blade type form tool holder, is to be made available to users of a well-known make of multi-spindle automatic lathes. The holder is particularly adaptable to short runs and cuts down time in tooling change-overs. It reduces the number of holders ordinarily required for a number of jobs.

get ready with CONE for tomorrow

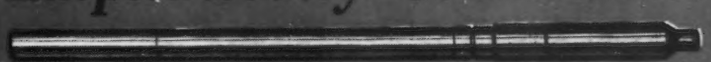
Dr. Baetjer, of Johns Hopkins University, prophesies that by 1950 one in every three women over fourteen will be employed in industry.

get ready with CONE for tomorrow

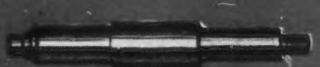
The *USS Salem* and *USS Newport News*, now being built, will be the first ships in what is promised to be a completely air-conditioned Navy.

FOLLOW THESE PAGES FOR NEWS OF PROGRESSIVE PRODUCTION

Emphatically Conomatic!



25⅝" long, 16 operations in 63 seconds from 1⅜" dia. hot rolled.



10⅞" long, 16 operations in 65 seconds from 1 41/64" dia. SAE 4620.

10⅝" long, 12 operations in 54 seconds from 1⅝" dia. SAE 3115.

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Take advantage of the unmatched ability of ROSS Straddle Carriers and Lift Trucks to handle heavy loads—up to 30,000 pounds—on rough ground, mud or snow. These rugged machines will enable you to store your materials out-of-doors—where space is cheaper and less restricted—and help you lick the problem of congestion in warehouse and plant... The complete facts about how The ROSS System of Straddle Carriers and Lift Trucks cuts handling costs all along the line will convince you—send for ROSS BOOK AI-78.

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DIRECT FACTORY BRANCHES AND DISTRIBUTORS THROUGHOUT THE WORLD

tons; old record, 46,225 tons, July, 1946.

(4) Pipe finishing—50,068 tons; old record, 47,026 tons, July, 1946.

(5) Shipping—51,125 tons of seamless pipe; old record, 47,661 tons, March, 1945.

October, 1946, was not only the highest production month in the history of National works, it was a safe month too. Not one employee suffered a lost-time accident.

Pullman-Standard Uses Two Way Radio to Aid In Plant Efficiency

Michigan City, Ind.

• • • Two way radio telephony is now a reality in industrial use with the installation at the Haskell & Barker freight car plant of Pullman-Standard Car Mfg. Co. Mobile stations are now operating under the first industrial authorization which has been granted by the Federal Communications Commission.

Although two way radio service has been used in many railroad applications this installation is the first to be used within the confines of a large manufacturing plant to increase operating efficiency. The installation consists of a Motorola central station and six mobile units. Four receiver transmitters are located in 45-ton diesel switch engines, while two more have been installed in locomotive cranes, which are used to unload materials at production lines or to perform routine maintenance. The central control station is housed in a special soundproof room in the scale house of the plant.

"In the past we have tried to predetermine where and when this equipment would be needed and used when making work schedules," A. A. Logmann, manager of the works, said, "but often unforeseen circumstances made the schedule impractical." Mr. Logmann further explained, "When emergencies arose, it took the yardmaster an hour or more to locate an engine or crane and get it where it was needed, wasting many manhours on the production line. With radio equipment, the yardmaster can keep track of every locomotive and crane and direct it in a matter of seconds."

The FM equipment works on the

Call the
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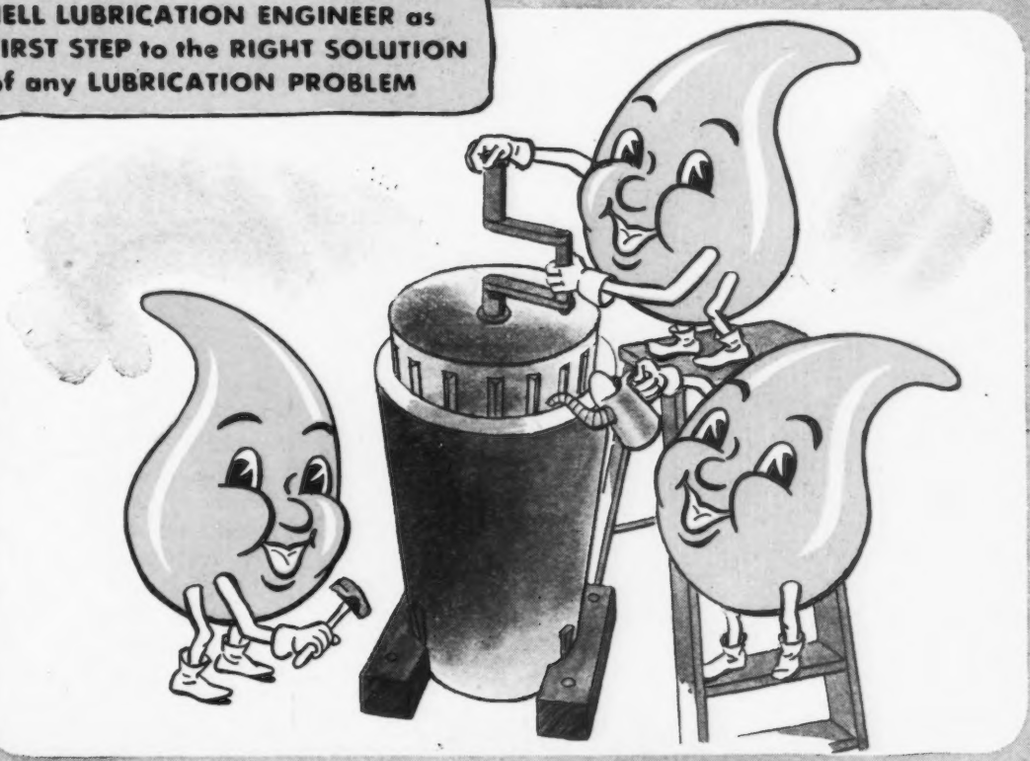

SHELL METAL-WORKING OIL gives 25% increase in PUMP CYLINDER HONING

PROBLEM: Honing of large reciprocating pump cylinders 20 inches in diameter and 4 feet in length was "going slow" because metal particles were loading the hones . . . glazed hone surfaces produced an inferior product finish.

SOLUTION: When the Shell Lubrication Engineer surveyed the problem, he recommended the use of a Shell cutting oil, cut back for optimum flushing and cooling action. Improvement in the honing operation was immediately evident. A finer finish was produced, *and production was increased by 25 per cent.*

CONCLUSION: It pays to consult the Shell Lubrication Engineer, regardless of the nature or size of your lubricating problem. Write for informative literature on Shell Metal-Working Oils. Shell Oil Company, Incorporated, 50 W. 50th St., New York 20, New York, or 100 Bush St., San Francisco 6, Calif.

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For every metal . . . for every operation

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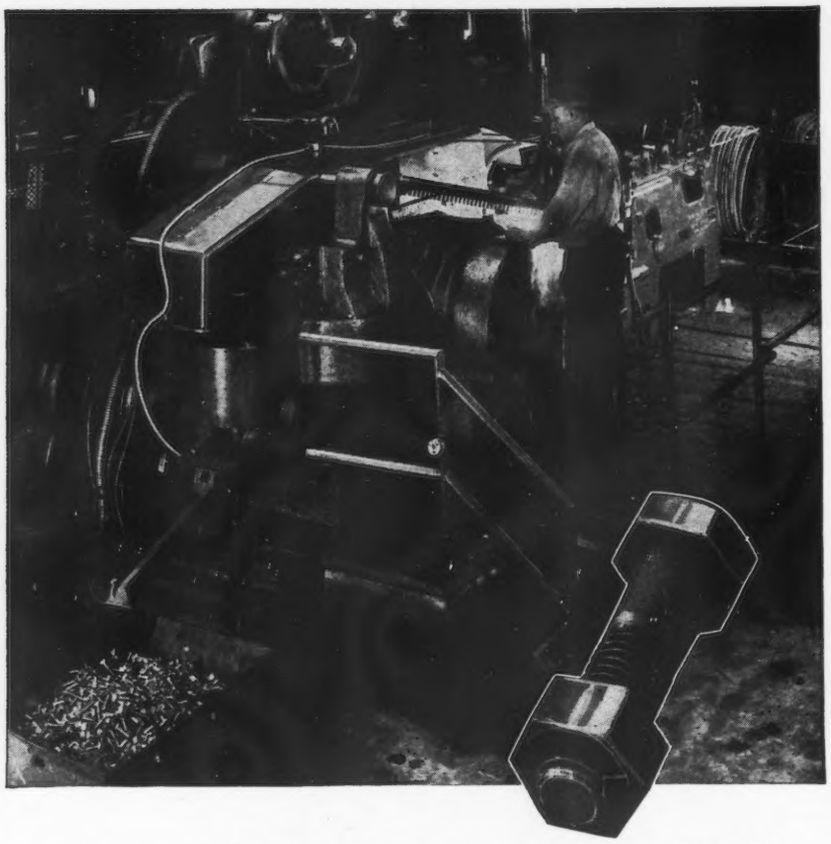

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Better fits, faster threading-on, tighter joints, are assured by the accuracy of Oliver Industrial Fasteners. Above is shown one unit of a battery of modern bolt-making machines used in the production of Oliver bolts. Amazing accuracy and uniformity are here achieved with the advantages of cold-forming and mass-production.

Ordinarily the cost of installing and assembling an industrial fastener in a machine or fabricated structure is many times the cost of the fastener itself. Therefore, you want the best fasteners you can get. The greater dimensional accuracy, cleaner threads, well-formed heads and bodies of Oliver products are reflected in faster assembly and appreciable cost savings for you. When you specify OLIVER, you are sure of getting the best!

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new 152-162 megacycle high frequency wave band assigned by the FCC. The diesel locomotive installations have been provided with a generator connected directly to the engine, which operates a standard battery system, supplying power for the radio. Steam cranes have a 6-v gasoline driven generator supplying the power.

Says NSMPA Figures Fail to Disclose Signs Of a Business Setback

Cleveland

• • • Pessimistic prognosticators can find little in the screw machine products industry business index as compiled by the National Screw Machine Products Assn. to support their contention that business is due for a drop.

According to Orrin B. Werntz, executive secretary of NSMPA, the stock market break does not yet indicate lowered production, but rather an era of profitless prosperity.

He said while the screw machine products industry is producing more than double its best peacetime year, in dollar volume, advance indications are that percentagewise the industry will earn much less money in 1946 than in 1940. Total industry sales volume for the year is now indicated at close to $250,000,000.

NSMPA's index, which has been a good advance indicator of recessions and depressions as well as good times to come, reached a low in December 1945 and has climbed steadily each month of 1946, reaching a new high in September, with a total order volume more than double 1940 and with an estimated backlog of more than 20 weeks.

On the basis of past performance, NSMPA's index cannot be brushed off lightly. In 1929, the industry's shipments fell off sharply six months before the crash. In 1932, the industry's shipments reached their all-time low in August and turned up well before both election and the resulting 1933 sharp rise.

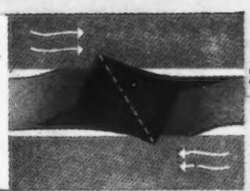
In 1937, shipments peaked two months before the March market crash and the subsequent business recession. In 1940 NSMPA's business index climbed rapidly, starting

SEMS... the cost-saving, pre-assembled washer and screw units

ARE AT THEIR BEST WITH

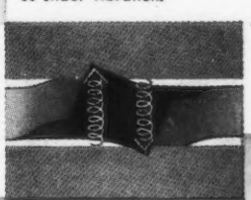
SHAKEPROOF LOCK WASHERS

TRUT ACTION. Each pered-twisted tooth tes into both sur- ces, setting up a werful strut-action hich resists any back- ard movement of rew.



LINE BITE. The exclusive tapered-twisted teeth assure substantial line bite at initial contact. This actually increases under vibration.

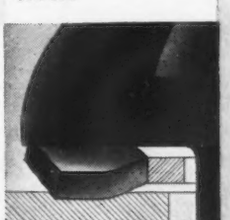
SPRING TENSION. As ibration begins when product is put into use, pring tension forces he teeth to bite deep- er—maintaining posi- ive lock.



CHECK THESE SHAKEPROOF ADVANTAGES

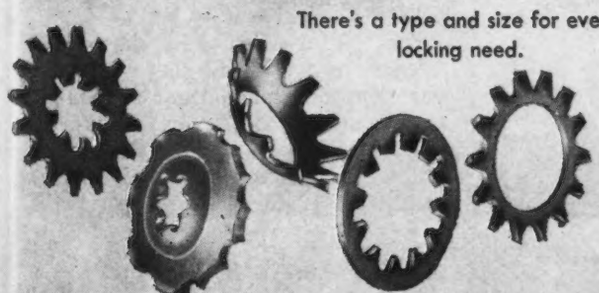
MAXIMUM TOOTH ENGAGEMENT. Shakeproof Lock Washers for SEMS fit closer to screw shank and thus assure maximum tooth contact.

POSITIVE CONCENTRIC SEATING. The Shakeproof Lock Washers used for SEMS hug the screw shank and keep the washer in perfect concentricity; avoids buckling or turning.



You buy the most efficient pre-assembled washer and screw unit obtainable when you order SEMS equipped with Shakeproof Lock Washers for here are all the inherent advantages of SEMS combined with the *ultimate in locking power!* You speed up production, reduce assembly costs and at the same time improve product quality because the multiple tapered-twisted teeth of the Shakeproof Lock Washer actually lock tighter—make the fastening more secure—as vibration increases. Check the advantages illustrated . . . here are five good reasons why you'll want the SEMS you use equipped with Shakeproof Lock Washers. Send for free testing samples today!

There's a type and size for every locking need.



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the PROBLEM Installing an effective magnetic separator in a large steel castings foundry for removal of scrap from the shakeout sand conveyor belt was difficult because of space limitations at the belt end preventing installation of a magnetic pulley, plus a large percentage of metal and a thick normal burden of material on the belt.

the SOLUTION Dings Engineers recommended installation of one of the powerful new Dings Self-Cleaning Rectangular Magnets above the conveyor. This machine provides the necessary magnetic strength to lift scrap out of the heavy burden efficiently, and gives clearance above the belt sufficient to prevent jamming even under unusually heavy load conditions. A transverse belt carries accummulated scrap off the conveyor and dumps it alongside, as shown above.

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"Magnetic Separation Headquarters Since 1899"

Dings
"HIGH INTENSITY"

in September, six months before many industries felt the real effect of war preparations.

The question raised by the NSMPA index is — "If the stock market presages a business recession, why is the industry following rather than leading the stock market, as it has in the past? And, since orders represent the thinking of the end-use producers of mechanical goods, why is their thinking not affected by the stock market, and translated in terms of cancellations or fewer orders?"

According to Mr. Werntz, the reliability of the index is based on the fact that screw machine products are made to order and are one of the first things purchased by companies planning production.

"NSMPA feels the sensitivity of its index stems from the fact that the planning boards of the larger industries, such as automotive, electrical and farm implement, must first analyze the potential market and after analysis determine how many units the market can absorb," Mr. Werntz pointed out.

He added that such information is passed on to purchasing agents, who place orders. Estimates precede orders, therefore the screw machine products industry is one of the first to receive advance notice of the thinking of the planning boards.

Car Registrations Up

Detroit

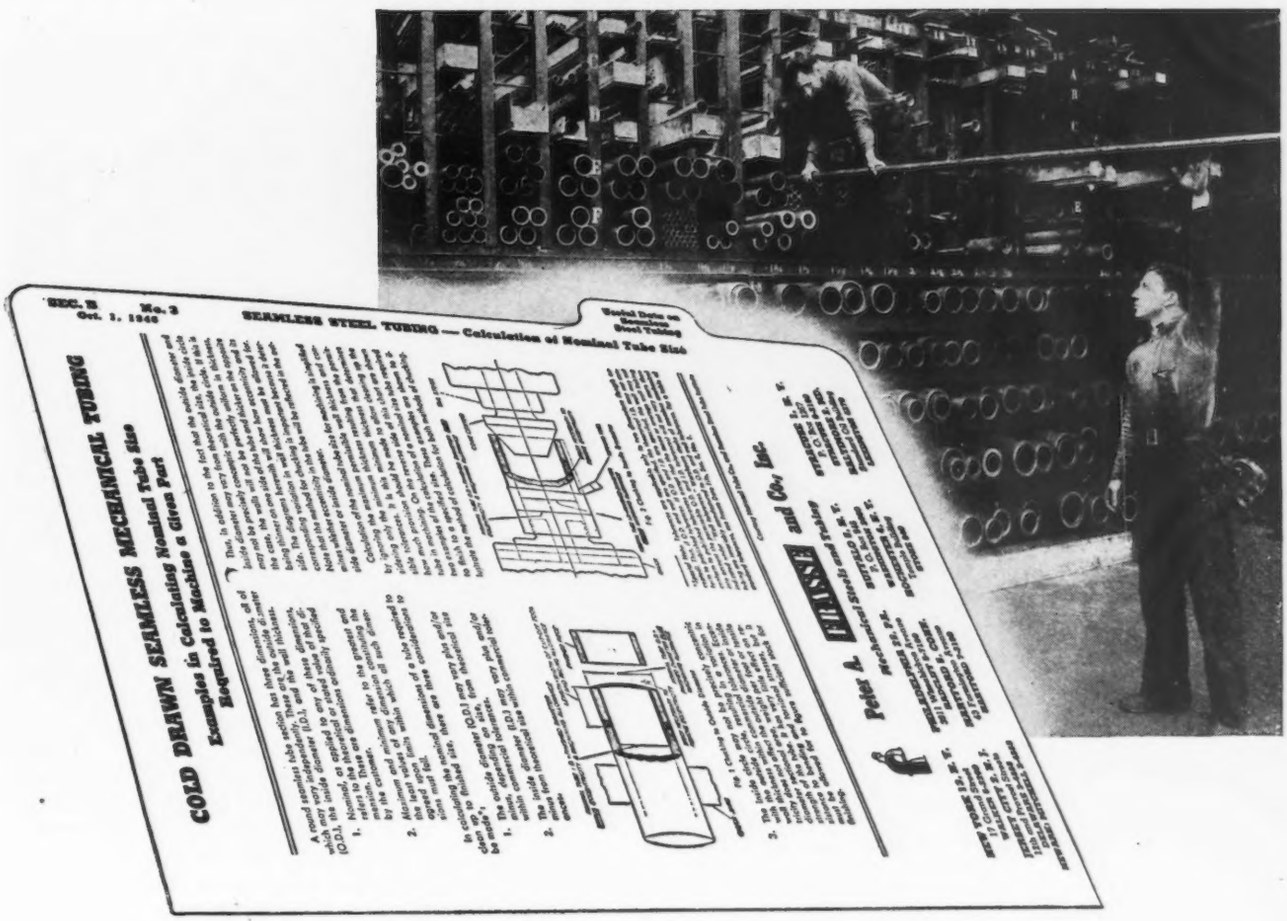
• • • **Estimated new** car registrations for the month of September may equal 200,000 units according to R. L. Polk & Co., statisticians for the automobile industry.

U.S. Zone Steel Output Up

Washington

• • • **Production of** finished steel in the United States zone in Germany in the week ended Oct. 30 was 33 pct over the preceding week, according to a report of the Military Government to the War Dept. Pig iron and steel ingot production was 6 and 4 pct ahead, respectively.

The Inter-Allied Reparations Agency nations, who before the war depended on Germany's nonferrous metal goods, are asking for allocation of nonferrous plants whose dismantling awaits economic unification of Germany.


SEC. B
Oct. 1, 1946
No. 3
SEAMLESS STEEL TUBING — Calculation of Nominal Tube Size
COLD DRAWN SEAMLESS MECHANICAL TUBING
Examples in Calculating Nominal Tube Size Required to Machine a Given Part
Peter A. FRASSE and Co., Inc.

You cut tubing costs with this data chart!

This new Frasse Data Chart prevents machining rejects...reduces scrap loss...saves money for tubing users.

How? By showing how to figure the tube size that *best* machines to your finished dimensions. It explains dimensional tolerances in seamless tubes . . . gives typical examples to follow . . . and clearly explains differences in figuring for O. D. and I. D. chucking.

With this Frasse chart, you (1) eliminate guesswork, and the waste resulting from overguessing "to be on the safe side" (2) remove any possibility that work will not clean up to finished size.

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TYPE M. T. C.
... by CHICAGO METAL HOSE

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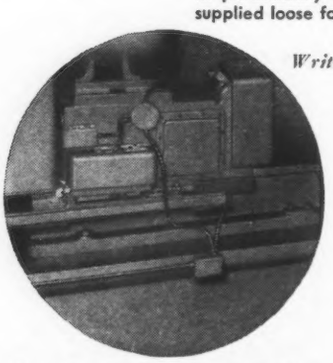
- Synthetic cover
- Extremely flexible
- Smoothness of flexible metal hose bore prevents excessive abrasion
- No detrimental abrasive surfaces throughout hose-fitting assembly
- Liquid-tight externally
- Liquid-tight steel fittings—usable with both standard and water-tight conduit boxes
- Fittings are attachable and re-attachable by user—or can be permanently attached at factory
- Sizes from ⅜-in. I. D. to 1½-in. I. D. inclusive
- Furnished in mill lengths or cut lengths, with factory-attached fittings both re-attachable or permanently attached—or with fittings supplied loose for user to attach.

Write for Bulletin M. T. C.—46



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Gear Group Seek Data On Simple Standards For Surface Quality

Chicago

• • • Holding that the term "evaluate" was a poor one to be utilized in discussing surface roughness of gear teeth, L. D. Martin, chairman, fine-pitch gearing committee and gear engineer, Eastman Kodak Co., explained that the prime purpose of committee members was to establish a uniform manner of classifying and comparing types of finishes so that a simple set of standards might be established.

Mr. Martin was presenting a paper on "Evaluating Surface Roughness of Gear Teeth," at the 30th semiannual meeting of the American Gear Manufacturers' Assn., held here recently. About 200 members attended the business affair at which engineering, commercial and administrative committes presented data.

Backing up his contention that it was not the desire or intention of the fine pitch gearing committee to appraise or set a value on any type of gear tooth finish, Mr. Martin displayed a plaque in which 21 fine-pitch spur gear teeth were inlaid. Seven different processes of manufacture, namely: Hobbing, shaping, milling, burnishing, shaving, grinding and lapping were designated by letter symbols A to G. Under each of the seven groups were three teeth of slightly different degrees of roughness designated by numbers 1 to 3. This plaque was a facsimile made from an original, and Mr. Martin explained that similar exact copies could be made without difficulty by the U. S. Rubber Co.'s electroforming process.

Such a plaque, made available to all manufacturers, would put an end to all doubts as to what type of finish was required on any specific gear, and it would be necessary merely to specify, for example, AGMA finish A2, and any gear manufacturer could understand and reproduce it.

It was generally agreed that such plaques would prove of great value, but Mr. Martin pointed out that the sample presented represented examples of the work of only a few members, and that before any definite standards could

COMPLETE *Finishing* SYSTEMS

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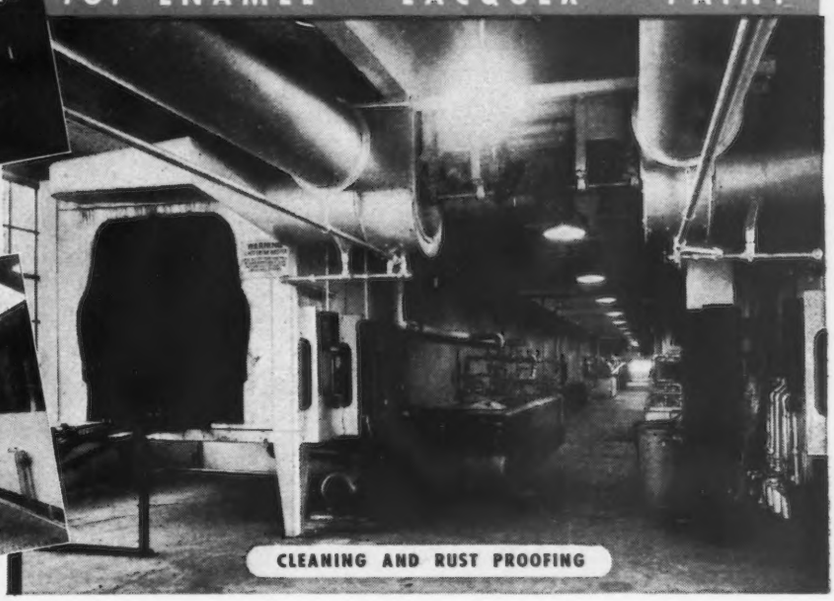
SPRAYING: Mahon Spray Booth Arrangement for painting underside of automobile bodies.

SPRAYING: Mahon Hydro-Filter Spray Booths in a typical automobile body painting production line.



CLEANING AND RUST PROOFING

DRYING AND BAKING: Typical Mahon tunnel-type drying and baking ovens for automobile bodies.

PAINT RECLAIMING: Typical Mahon overspray reclaiming system—part of a large automotive installation.

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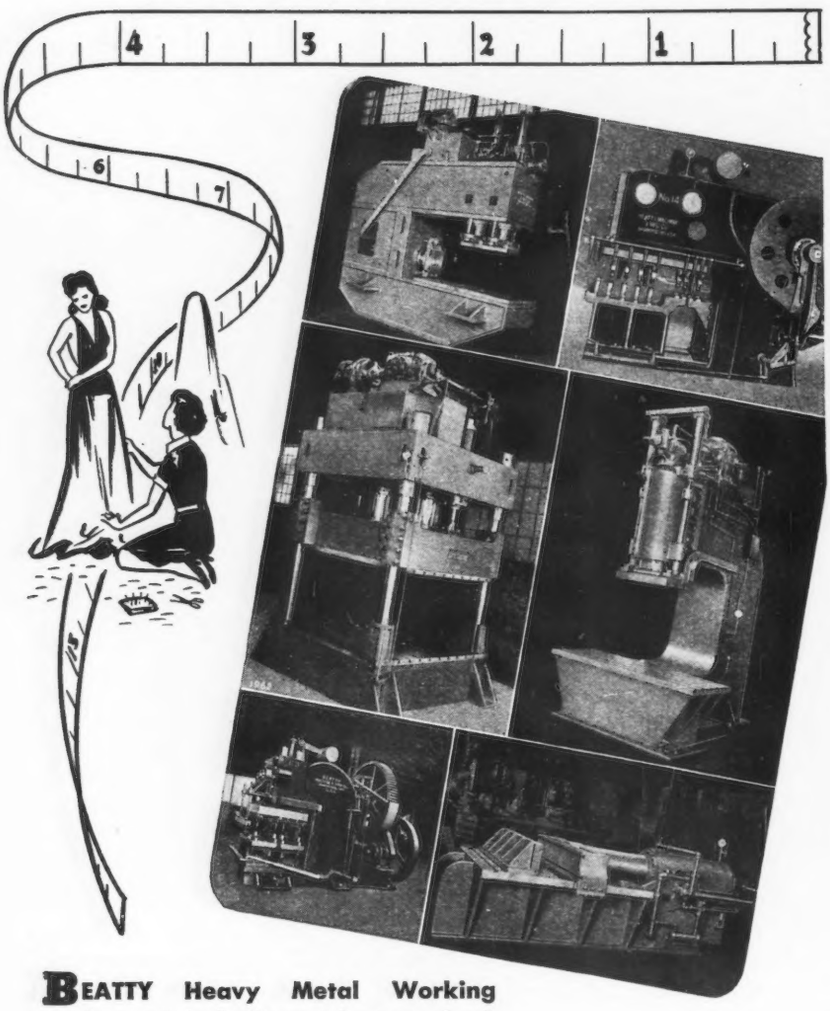

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BEATTY MACHINE AND MFG. COMPANY
HAMMOND, INDIANA

be established it would be necessary for a great many more samples to be collected and examined. He therefore urged all members to send him sample spur gear teeth indicative of the type of surface quality they were able to produce. Some 200 specimens will be required to establish a fair standard, and he urged that these be sent in as soon as possible. Such samples, Mr. Martin said, should represent the true surface produced by the particular process, and not a composite surface of several.

Concerning the actual study of gear tooth surfaces, Mr. Martin pointed out that at the present time there are no instruments capable of doing this. Both the Brush surface analyzer and the Profilometer have certain limitations which make it doubtful whether they can be adapted to reduce the checking of gear tooth surfaces to the same basis as other machine parts. Several other companies, however, are interested in the problem, and work is going forward on the development of special equipment for this purpose. Before this can be completed it will be necessary to furnish the builders with some yardstick or basis of comparison, and work cannot go forward until standards have been established by the committee.

The second technical paper, presented by H. J. Clyman, assistant to manager of engineering, Aviation and Gas Turbine Div., Westinghouse Electric Corp., dealt with jet propulsion and gas turbines in aviation. After explaining the different types of jet propulsion engines, rockets, ram jets, turbo-jets, turbo-props, and so forth, Mr. Clyman stated that in his opinion none of these were destined to entirely replace the conventional reciprocating engine. This, he said, would continue to be used for planes having a speed of up to 300 mph, the gas turbine-propeller type for speeds to 500 mph, and the straight jet type for high speed military planes and possibly for commercial flights on which a premium could be charged for increased speed.

All of the jet type engines, Mr. Clyman pointed out, require gearing to some extent, either for driving the accessories or, in the

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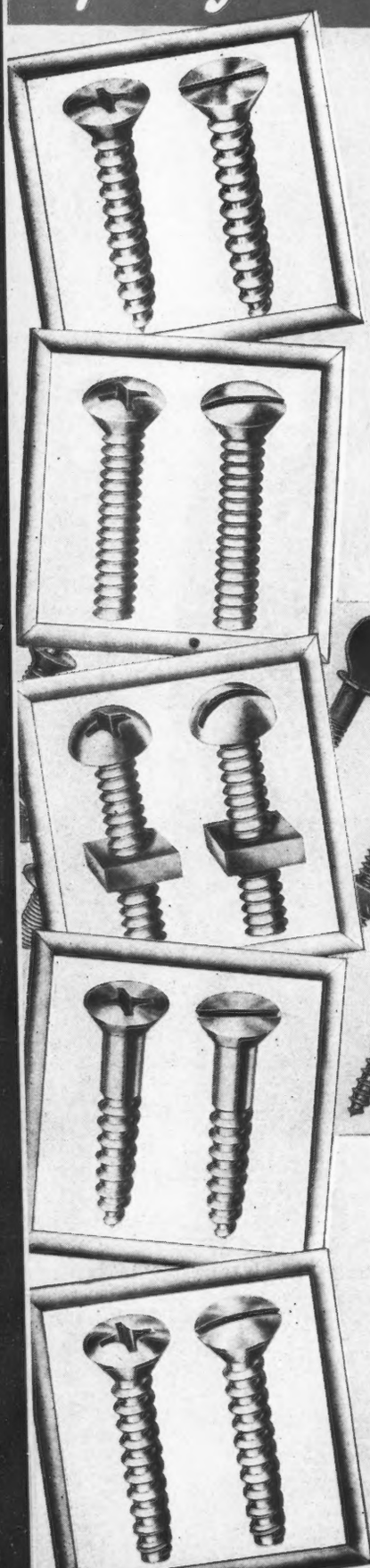

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New Bedford, Massachusetts, U.S.A.

case of the turbo-prop types, for the extensive propeller reduction gearing. The extremely high operating speeds, together with the high horsepower generated, which may, in the immediate future, attain 10,000 hp, impose tremendous loads, and numerous new design factors will have to be taken into consideration.

Lubrication, he said, is one item of major importance. The exceedingly low temperatures encountered at the altitudes in which jet powered aircraft operate most efficiently necessitate the use of very low viscosity oils such as light hydraulic types. Operating temperatures, on the other hand, may result in an oil outlet temperature from the bearings as high as 285°F, which is equal to the normal flash point of the oil. The high rotational speed of the gears introduces a further complication in that centrifugal force tends to whirl the lubricant off the gear teeth, and windage hampers the application.

Numerous questions were asked concerning the efficiency of jet type engines, and Mr. Clyman explained that specific fuel consumption was not the only factor to be considered. On the test block, he said, fuel consumption was noticeably higher than that of conventional engines, but in actual flight the overall efficiency would be materially increased by the reduction of nacelle drag, because of the smaller frontal area, and also by the relatively unchanging cooling horsepower consumption, as compared with the reciprocating engine in which cooling power consumption increases with an increase in speed.

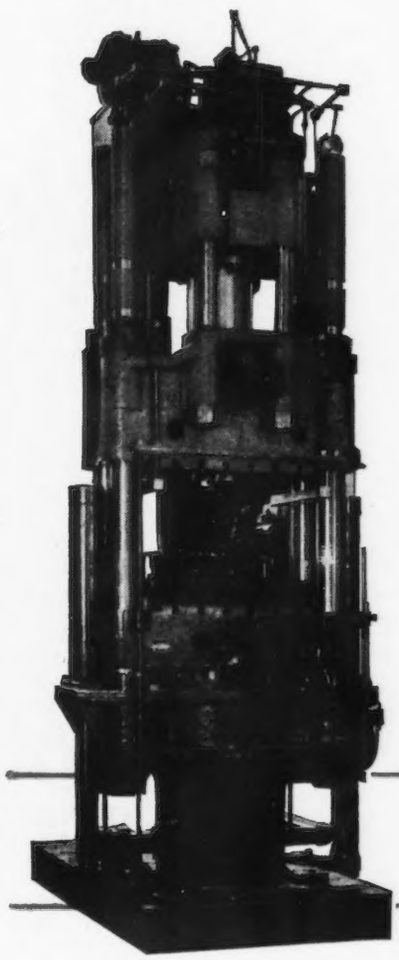
Western Wineries Expand

Fresno, Calif.

• • • **Leon S. Peters,** president of Valley Foundry & Machine Works, Inc., is predicting that more than $10 million will be spent by the California wine industry for machinery, equipment and buildings during the next 12 months.

Mr. Peters' estimates are based on the preliminary engineering work as done thus far by the local company for the wine industry. This company is considered to be the world's largest supplier of winery equipment.

Why STOP at just the STEEL CASTINGS?



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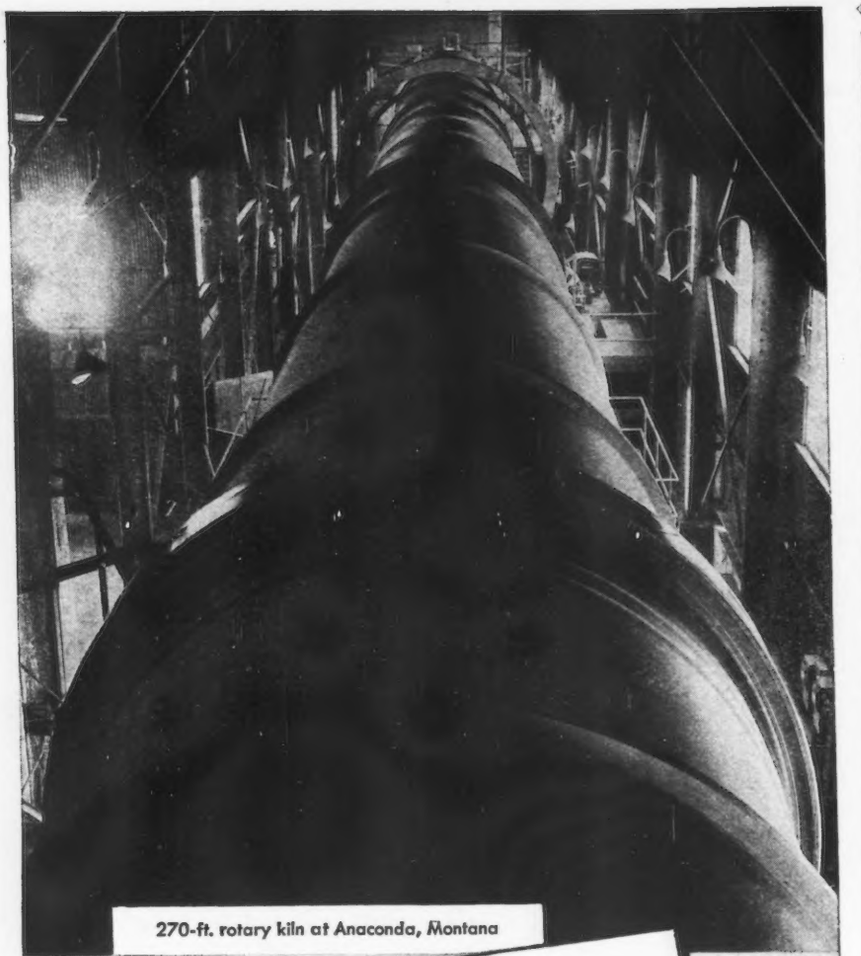

270-ft. rotary kiln at Anaconda, Montana

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SiO_2	8%
Al_2O_3	0.76%
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P	0.06%

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Bradford Celebrates 75th Anniversary Of Opening of Oil Field

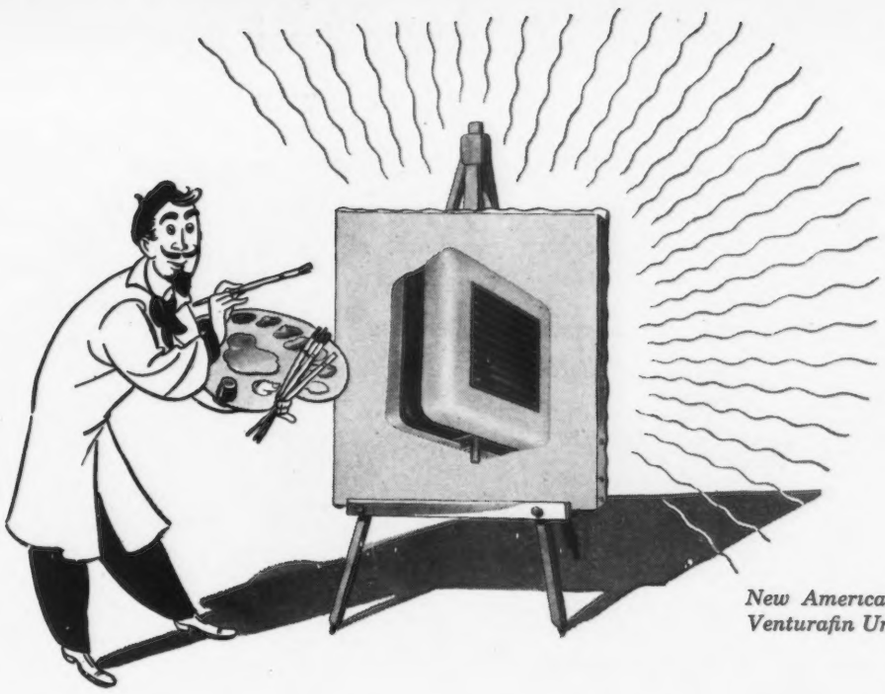
Bradford, Pa.

• • • Bradford, the center of Pennsylvania's crude oil production industry and one of the oldest large oil fields in the United States, celebrated this week the 75th anniversary of the opening of the Bradford oil field in 1871. The events of the three days, sponsored by the Board of Commerce and 300 independent oil producers, featured secondary oil recovery by water flooding, a method that was pioneered by Bradford district producers and now being applied increasingly in other oil fields. Water flooding of oil sands has given the Bradford district 20 yr of oil production that has now surpassed the volume of natural flow in its first 50 yr.

The Bradford oil field still ranks among top producing fields of the United States in both total and annual production, although its wells are "strippers" producing an average of little more than ½ bbl a day by means of secondary recovery. In recent years the Bradford district (in McKean County and extending over the New York state line into Cattaraugus County) has been supplying 80 pct of Pennsylvania's crude oil production and 50 pct of that of the whole Pennsylvania grade region (includes portions of New York, West Virginia and Ohio).

Development of the more costly production method of water flooding was made possible by the high value of Pennsylvania grade crude oil. Bradford grade oil brings a price of about three times that of oil from all fields west of the Mississippi River. This is because it contains the highest known quality lubricating oil and 10 times more than the crude oils from these fields. Bradford crude oil yielded 8 pct of all lubricating oil produced in the United States from 1941 to 1946.

At the present rate of oil recovery it is estimated that there will be left in the Bradford oil sands in 1960 more oil than will have been recovered up to that time. Any improvement in recovery



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Division of American Radiator & Standard Sanitary corporation

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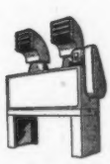
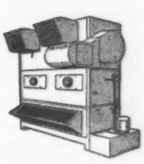


Heating Equipment

Ventilating Equipment

Gyrol Fluid Drive

Industrial Fans



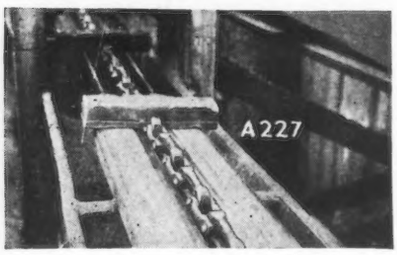
Air Conditioners

Dust Collectors

Performance Records of Manganese Steel Chain Sound Fantastic, *but they're True*

The assertion that Amsco Manganese Steel Chain has outlasted ordinary malleable iron or steel chain two to ten times is no overstatement, as is attested by performance records, which also demonstrate that the more severe the service, the greater the service-life ratio in favor of "the toughest steel known."

Picture A-227 shows an Amsco Manganese Steel chain which gave 23 years' operation in a lumber mill refuse drag. The forged coil chain which it replaced in this rugged service lasted only *six months.*



Picture R-863 shows manganese steel links used on a conveyor for handling butt ends from the hot bloom and slab shears to scrap in a steel mill. The constant wear of this operation was too much for the cold-rolled links formerly used.

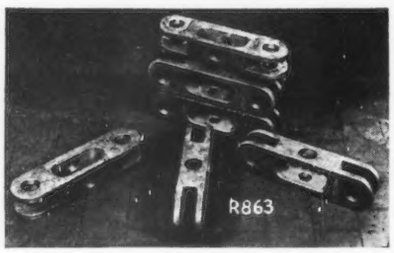
From users of manganese steel chain come reports like these:

"25 months of operation with but little sign of wear from Amsco H-110 chain in paper mill—replacing ordinary chain that lasted a maximum of 8 months."

"Amsco No. 830 on our sand washer has been in a full season without breakage — much better service than that afforded by ordinary chain."

"Amsco chain in use almost five continuous years on ditch dredger in Texas—several times the service expected of ordinary chain."

It is manganese steel's property of work-hardening on the surface from



pressure and impact while retaining its tough body that accounts for the longer service life obtained from Amsco chain.

In your own plant, as well as in the equipment you build, there are probably applications where manganese steel chain will prove economical through longer life and also reduce lost production time.

Send for Amsco Chain Bulletin 742-CN.

Joliette Steel Limited, Montreal, Quebec, owned by American Brake Shoe Company, produces and sells Amsco Manganese Steel Castings in Canada.

AMSCO

Foundries at
Chicago Heights, Ill.; New Castle, Del.;
Denver, Colo.; Oakland, Calif.;
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Offices In Principal Cities

AMERICAN MANGANESE STEEL DIVISION
CHICAGO HEIGHTS • ILLINOIS

AMERICAN Brake Shoe COMPANY

methods that will enable recovery of only 5 pct of this volume will return $135 million at present prices.

Farm Equipment Output Declines in September

Washington

• • • **Attributing the decline** principally to the 3 less working days than in the previous month, CPA reports that production of farm equipment in September was $63,275,584, a drop of 5 pct under the August output of $66,767,205.

Production for the third quarter amounted to $189,629,156, which was about 30 pct higher than the same 1945 period, when output totaled $145,946,727. Decreases of 20 pct were recorded in haying equipment and machines for preparing crops, and 17 pct in tractors. Harvesting machinery output was unchanged. Output of tractors totaled 23,804 units in September compared with 28,420 in the previous month.

Douglas Buys Surplus Plant

Washington

• • • **WAA has announced** the sale of the major part of a government owned aircraft plant at Long Beach, Calif., to the Douglas Aircraft Co., wartime operator. WAA said the sale price probably would exceed $7,500,000 although the exact amount will not be determined until the government's holdings are audited. Douglas Aircraft Co., which used the plant to turn out B-17, A-26 and C-74 type military aircraft for the war effort, will continue in the production of aircraft, both military and civilian, it was stated. The company plans also to manufacture prefabricated houses, pending outcome of NHA negotiations.

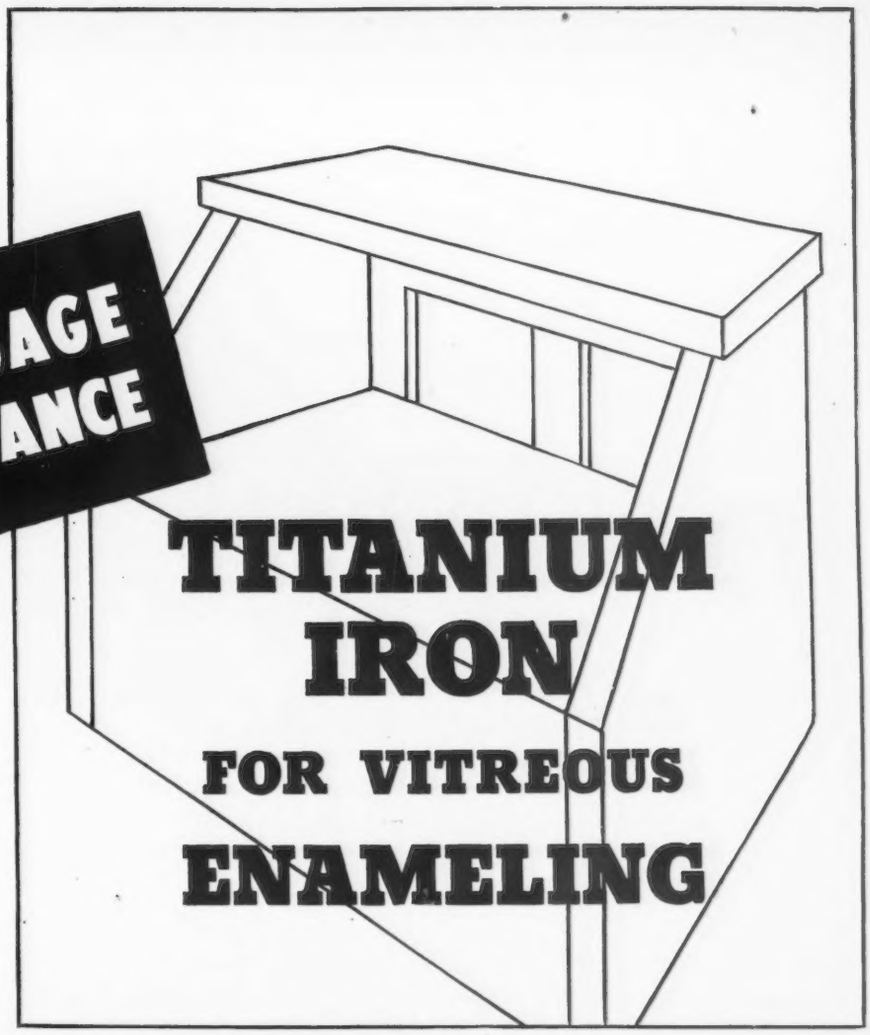
Bids for Velasquez Plant

Washington

• • • **Topped by an offer** of $23 million from the John Henry Alfred Bowman Co., seven bids to buy or lease the $56 million magnesium plant at Valasquez, Tex., have been received by WAA.

Dow Chemical Co., wartime operator, offered $18,995,000 cash as opposed to the Bowman offer which asked terms of 20 yr.

THINNER GAGE SAG RESISTANCE



TITANIUM IRON FOR VITREOUS ENAMELING

ENAMELED WARE of lighter gage stock can be fabricated to desired shapes and retain a better appearance because of the increased sag resistance of Titanium iron for vitreous enameling. This particular feature is clearly demonstrated on chart at right.

Another feature is the elimination of formerly necessary ground coats. For—under proper shop conditions—the cover coat can be applied directly to the base metal. Also, these thin finishes reduce the hazards of chipping and breaking. Furthermore, at enameling heats, there is no sign of enamel boiling. During three years of both research and production experience, no case of fish scaling has been reported.

Further information is available upon request.

EFFECT OF GAGE AND COMPOSITION ON SAGGING RESISTANCE

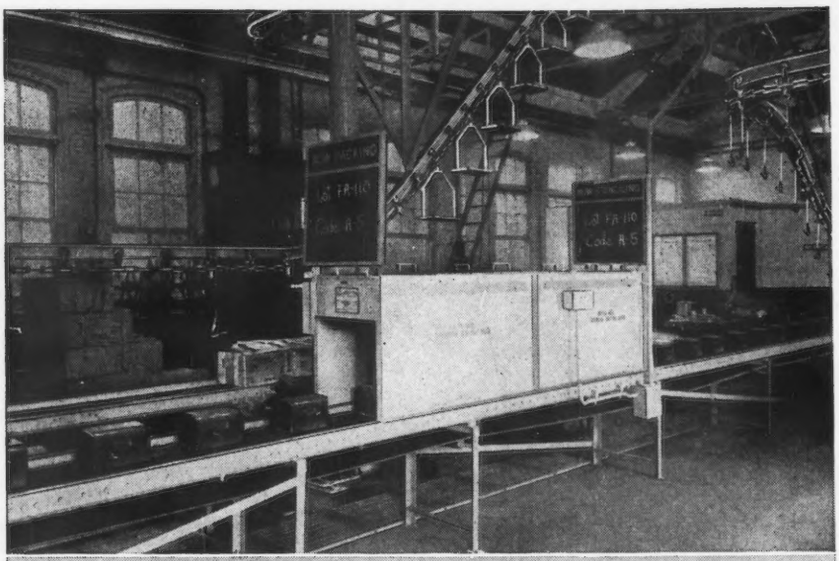
GAGE AND COMPOSITION	DEGREE OF SAG IN %
24 Ga. Standard Enameling Iron	100
24 Ga. Titanium Steel	57
18 Ga. Standard Enameling Iron	100
18 Ga. Titanium Steel	18

The Titanium Alloy Manufacturing Company produces the titanium alloy used in the manufacture of this steel. For samples of this steel, see your steel supplier. Pending patent applications on the new enameling process and products made thereby are owned jointly by Inland Steel Company, and The Titanium Alloy Manufacturing Company under trust agreement.

TAM

TITANIUM ALLOY MANUFACTURING COMPANY

Executive Offices: 111 Broadway, New York City *General Offices and Works:* Niagara Falls, N. Y.

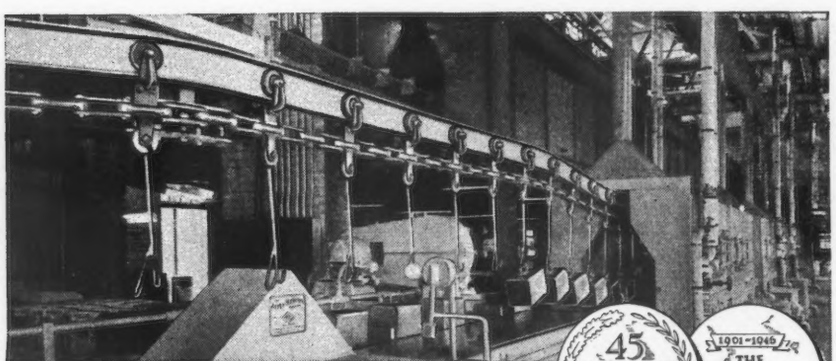


ANOTHER COMPLETELY CO-ORDINATED CONVEYING AND FINISHING SYSTEM...
A-F Engineered and Manufactured

IN THE LARGE plant shown, the two illustrations picture an A-F Conveyorized infra-red stencil drying unit and an A-F Overhead Trolley Conveyor carrying filled, hermetically sealed containers through a cleaning and drying unit. In all, *thirteen different operations* are performed, including tests for leaks, two washes, two rinses, drying, surface treatments, paint dippings, stenciling and infra-red drying. From unloading platform to storage and shipping, the work flows quickly, efficiently, economically!

WITH TWO correlated departments for designing, engineering and manufacturing conveying equipment and metal products cleaning and finishing equipment, Alvey-Ferguson is unique in being able to offer you a completely co-ordinated and conveyorized cleaning and finishing system based on forty-five years of experience.

There is no substitute for this 45 years of experience. It can help you in many ways. Why not discuss *your* materials handling problems, products handling problems and metal products cleaning and finishing problems with A-F Engineers? Write today!



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METAL PRODUCTS CLEANING & FINISHING EQUIPMENT

Ferguson Engineers Develop New Low Cost Steel Frame Factory

Pittsburgh

• • • **The H. K. Ferguson Co.,** industrial engineers and builders, have announced the development of a modern, steel frame, fire-resistant factory building which can be built at a cost of $3 per sq ft on today's market. The average cost of conventional and individually designed industrial structures ranges from $5 to $7 per sq ft at the present time.

A "typical building for a typical industry," it can be utilized best for warehousing, machine shops or light manufacturing. It is not a specialized building for a heavy industry, the company statement explained. The design represents a minimum requirement and is directed primarily toward a goal of low first cost without sacrificing any desirable features required for low cost maintenance or satisfactory production layouts.

The low cost construction figure is predicated on two principal factors. One is the simplicity of building design, the other the simplicity of erection.

Its design is based on the use of standardized components throughout the entire structure. This may be best illustrated in the structural steel frame design, which requires 5.2 lb of steel per sq ft of floor space compared to 7 to 10 lb for buildings using monitor-type trusses.

The steel design is such that every beam, every column and every purlin in the structure is identical. This factor reduces steel fabrication costs considerably, since long production runs can be attained in the manufacture of these items. It simplifies steel erection so that trained field crews can assemble the components at a low cost.

The mass production principle is also carried out in other building units. All interior footings are identical and all wall footings are the same, a technique which permits re-use of concrete forms over and over again. The same principles apply to heating, general lighting, plumbing, sprinkler and sewer systems.

Ferguson engineers are also

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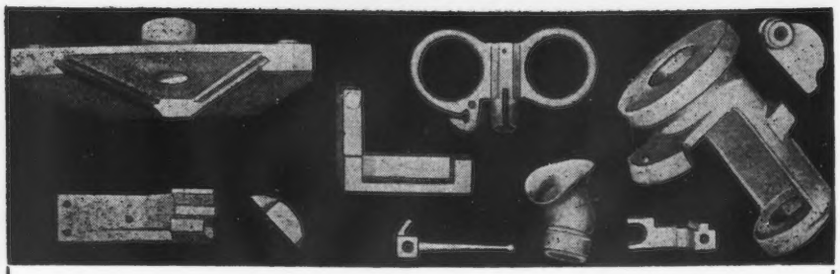

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Many small parts, covering a wide range of applications, are being produced in ferrous and non-ferrous metals by precision investment casting at substantial savings.

Production problems not easily met by conventional casting, forging or machining methods, may find a ready solution in this new, war developed method.

We can furnish, to established firms now engaged in precision casting, new equipment and a full line of operating supplies such as investments, pattern wax, flasks, tongs, fluxes, asbestos mittens, etc. To manufacturers who wish to obtain specific pieces produced by precision casting methods we offer information regarding possible sources of supply. To those who wish to set up their own precision casting department, we supply detailed information regarding required equipment and operating supplies.

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Did you Know?

Over 50% of furnace wall radiation losses alone can be stopped? Therm-O-Flake Insulation is preferred for this work in most steel plants.

Here's why!

Highest insulating value — easy to apply — low maintenance — low cost — high reclamation — sticks tightly to silica or basic brick — permits closer control of fuel-air ratios — reduces cold air infiltration.

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Illinois Clay Products Company
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Therm-O-flake
HIGH TEMPERATURE INSULATION
BRICK - BLOCK - COATINGS - CONCRETE - GRANULES

said to devise other money-saving techniques in the design of the structure. The 20-yr bonded roof is dead level, a condition which eliminates the need for extra roof carpentry and complicated steel and flashing designs. Another economy is the fact that there is no masonry above the window sash line, a condition which does away with the erection of expensive scaffolding and extra steel and masonry above the sash line.

The building exterior is painted concrete block. The bays in the structure are 24 x 35 ft and the ceiling height is 16 ft or less. It has a 5 in. thick reinforced concrete floor slab with a monolithic finish, and its 20-yr bonded roof is placed atop a metal deck insulated with fiberboard. The structure contains its own projection-type heating system, complete with boilers, firing equipment and other boiler house auxiliaries. It is well-lighted, has an approved sprinkler system and proper underground drainage. Toilet facilities are also included.

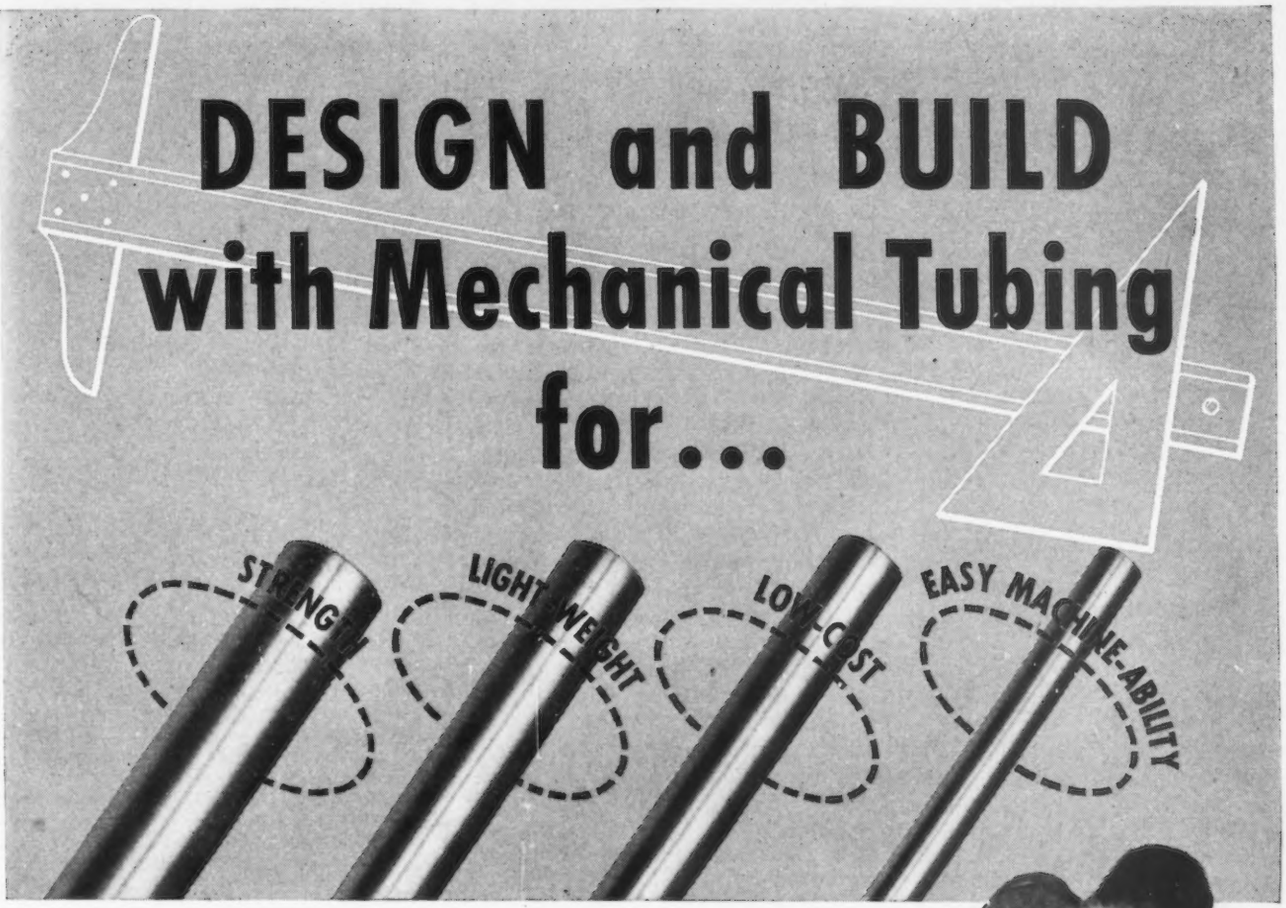
It was pointed out by the company that this $3 per sq ft building has many limitations. It definitely is not the answer to every manufacturer's building problem. Instead, it is merely an economical way to provide what could be termed "minimum" floor space requirements. This price can be met only when the structure can be built as a unit that will afford the constructor long production runs on steel, piping and other basic components in the simplified design. If manufacturers have special problems such as heavy overhead cranes, obviously the cost of the building will be more. The same is true of that part of the building which the owner wants finished off as office space.

Surplus Stock Inspection

Washington

• • • **Inspection of** surplus stocks of files and rasps used primarily in metalworking and recommendations for their disposal will be made by representatives of the file and rasp manufacturing industry, WAA has announced. The inspection party will visit one of WAA's regional warehouses and submit a report to the committee which in turn will make recommendations to WAA.

DESIGN and BUILD with Mechanical Tubing for...



Specify GLOBE for Mechanical Tubing of Uniformity and Quality

GLOBE Seamless Mechanical Tubing is produced by piercing from solid billets of steel — there are no seams or welds and it offers important advantages in maximum strength with minimum weight and usually requires little machining. It is an ideal material for load bearing machine parts where strength with a minimum of weight is needed.

Its economy, compared with solid stock for the manufacture of small machine parts, is everywhere recognized. Production costs are substantially reduced because it requires little machining.

The Globe Steel Tubes Co. specializes exclusively in the manufacture of tubing. This concentration of facilities provides a dependable source of supply and assures a consistently uniform quality of product . . . Globe engineers are at your service to assist in the selection of tubing of the exact characteristics you require.

Testing and inspection of Globe Steel Tubes are regular routine. Special problems of customers are studied, too, and physical and chemical tests, spectrographic and microscopic examinations of steels are made to select the correct analysis for each customer's particular needs.

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GLOBE MECHANICAL TUBING

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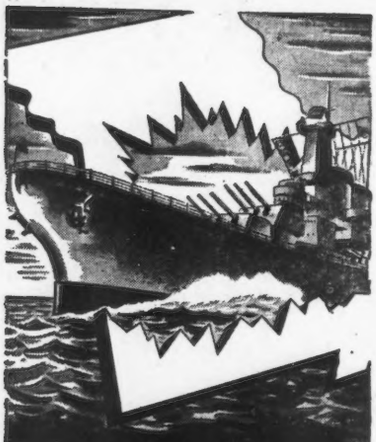
★ Condenser & Heat Exchanger Tubes
★ Seamless Stainless Steel Tubes
★ Globeiron High Purity Iron Seamless Tubes
★ Gloweld Welded Stainless Steel Tubes
★ Mechanical Tubing



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A mighty warship steams across the oceans of the world . . . the U.S.S. MISSOURI. And the name she bears so gallantly is an appropriate one, for the heritage of the state of Missouri is progress.
The men who are captains of industry recognize these advantages native to Missouri:

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Specialized, confidential service to industrialists. Write direct: Missouri State Division of Resources & Development, Dept. N62, Jefferson City, Mo.

THE STATE OF MISSOURI
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WAA Announces Several Central Staff Changes

Washington

• • • **Robert M. Field,** New York and San Antonio, Texas, former officer and director of various United States Steel Corp. subsidiaries, who recently joined WAA as vice-administrator for Washington Staff Operations, has been appointed acting associate administrator to replace Brig. Gen. Don G. Shingler, who has been recalled to active duty. Mr. Field will be concerned with surplus property sales matters, including the development of sales plans, policies and procedures, conduct of sales, costs and net returns. He will also act as vice-chairman of the Special Advisory Committee to the Administrator.

James A. Mollison, San Diego, Calif., former deputy administrator for Aircraft Disposal, has succeeded Mr. Field as acting vice-administrator for Washington Staff Operations. John H. Carey, of Valley Stream, N. Y., former associate deputy administrator for Aircraft Disposal, is now the acting deputy administrator, Office of Aircraft Disposal.

Open Hearth Society Elects New Officers

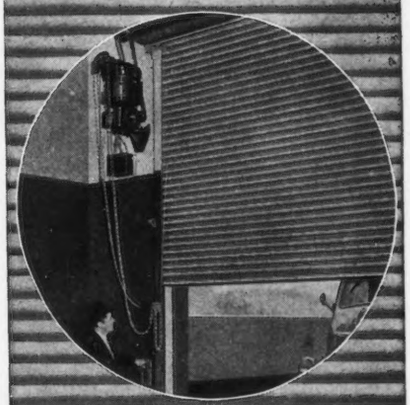
Pittsburgh

• • • **The Acid Open Hearth** Research Assn. has elected the following officers for the ensuing operative year: President, J. L. Nichols, American Locomotive Co.; vice-president, Francis B. Foley, Midvale Co.; secretary, F. C. T. Daniels, Mackintosh-Hemphill Co.; treasurer, A. R. Altman, Heppenstall Co.; director of research, Dr. G. R. Fitterer, University of Pittsburgh.

The association reports a furnace control method has been introduced which guarantees uniformity in temperature and quality of the steels from heat to heat with accompanying reduction in time and cost.

The present progress of studying the influence of the methods of charging, the composition of the charge together with oxidation and deoxidation should also effect valuable results.

KINNEAR



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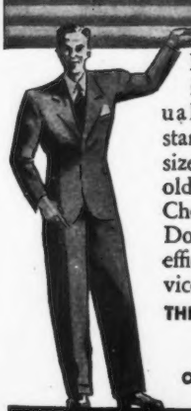

Each Kinnear Rolling Door is individually assembled of standard parts to fit any size door opening, in old or new buildings. Choose Kinnear Rolling Doors for extra years of efficient, low-cost service. Write for details.

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KINNEAR
ROLLING DOORS

The London Economist

(*Continued from page* 115)

the two weakest links in the government program for veterans —housing and jobs. Without either of these unhappy burdens, the VA is undoubtedly in a stronger position **vis-a-vis** Congress than it would otherwise be. All the same, there is plenty left for it to do.

ONE of its major functions is the handling of cash benefits. Over 2½ million people have been awarded war pensions of one kind or another as compensation for a death or a disability. This is one part of the program where the peak of new applications has probably passed. In others, such as education, the peak is still to come. This year, while there were 5,549,650 applications for education and vocational rehabilitation to Sept. 30, only 1,382,563 veterans are in government-financed training. Next year, when colleges and schools have worked out new ways to absorb them, the number is expected to rise to at least 2½ million. At present, nearly 600,000 veterans are being trained on-the-job, usually in factories, and almost 800,000 in educational courses.

The chart of applications for veterans' loans, too, shows an ever-steepening upward curve. So far the commitments have exceeded $600 million. Out of about 280,000 approved loans, only 10,000 are for farms and 25,000 for business ventures. Meanwhile about 240,000 loans have been made to veterans to buy houses—sad proof of the inadequacy of the homes-to-rent building plans. No one has yet cared to calculate what will happen when the bottom drops out of the real estate market.

Much more serious, for the VA, is the large volume of applications for readjustment allowances. A veteran is entitled to this form of unemployment compensation for a maximum of 52 weeks. He draws $20 a week—hence the nickname, the "52-20 Club." In a period of high employment, General Bradley thinks over 7,115,000 separate applications up to the middle of the year is too many. Besides, over 1,507,000 have been repeaters, coming back for a second spell on the dole.

One difficulty is that the United

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INDUSTRIAL PERFORATIONS include round, square and special shaped perforations as used in mechanical arts. Our line is comprehensive.

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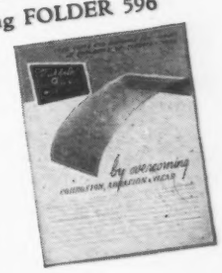
YOU'LL BE FAR AHEAD ON COSTS AND PERFORMANCE

"Buffalo" Stainless Steel Wire Cloth has brought new economy and efficiency to thousands of installations where cloths of other metals and alloys were formerly used.

Chief among the reasons are: higher tensile strength than ordinary steel, greater toughness, ability to withstand impact, freedom from rust or tarnish, retention of strength at high temperatures, resistance to abrasion and innumerable corrosive elements.

Most likely, "Buffalo" Stainless Steel wire cloth can do a job for you, too. Don't delay the possibilities. Act now by requesting FOLDER 596 for valuable data on corrosion resistance, effects of higher temperatures, use with other metals, mesh and wire sizes.



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ESTABLISHED 1869 AS SCHEELER'S SONS

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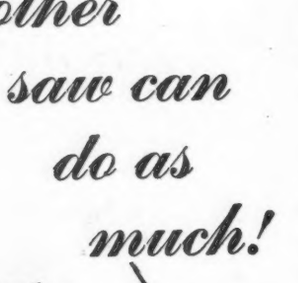
No other saw can do as much!

No Other Saw Can Do As Much! MARVEL Universal Band Saw, 18" x 18" capacity, will cut-off, slot, trim, mitre, notch, rough-out, or split bar stock, pipe, structural sections, mouldings, tubing, large standard blocks, or small irregular shapes with speed, ease, and convenience. Few shops working with metal can afford to be without this most versatile of all saws.

MARVELSAWS

Mitre cutting is simple and accurate with the MARVEL Series 8 Band Saw. No change in position of work. Simply set the saw column at any required angle up to 45° either right or left of vertical. Do not confuse with any other "band saw." There is no other machine like the No. 8 MARVEL.



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Being the largest exclusive manufacturer of metal sawing machines and blades, both hack saw and band saw type, we have the correct answer to your cut-off problems. Each MARVEL model has a distinct application, so write us and we will send our catalog, price and recommendation for the saw to fill your requirements most efficiently. MARVEL sawing engineers are also available to discuss and analyze your cut-off work. (Without obligation of course)

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By making slight changes in the formula, we are able to give ***Strenes Metal*** special characteristics in hardness, toughness, density, temperability, acid resistance, magnetic qualities, etc.

Strenes Metal cast dies have saved a lot of money for manufacturers of appliances, automobiles, blowers, caskets, implements, tractors, trucks, and vaults.

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Strenes Metal DRAWING AND FORMING DIES

THE ADVANCE FOUNDRY COMPANY

100 SEMINARY AVE., DAYTON 3, OHIO

States Employment Service, through which veterans are supposed to find civilian jobs, has been returned to administration by the States, not all of which manage it as well as they might. VA officials can offer local advice and some supervision but they dare not raise the bogy of federal interference. The problem of fitting veterans relatively untrained in civilian work into the right job is not easy, as the ½ million veterans who have reenlisted rather than face the insecurity of civil life have found out.

The sum obstacle of states rights is involved in the on-the-job training program. The VA is sure there are plenty of cases where government money is being used to subsidize wages and where the veterans are not in fact getting the training the government is paying for. But the states do not apply uniform standards of what is, and is not, training, and it is they who have the right of inspection and certification.

The other major responsibility of the VA is medical care for veterans. In fact one third of its 176,000 employees are currently dealing with the hospital program and this proportion may rise when the 78 new hospitals are built. In parenthesis, it is worth noting that the percentage of psychiatric patients in the wards of veterans' hospitals runs as high as 60 pct, which, by itself, creates an important technical problem of finding enough qualified staff to make the cost of hospital care pay off in results.

Apparently, however, most veterans expect to live and learn. One part of the Administration's program which has not caught on is the national insurance scheme. Under this, any veteran can keep up a life insurance policy started for him by the Army and Navy while he was in uniform at very much lower rates than he would pay to a private company. But only one veteran in four has paid up on his premiums and $90 billion worth of insurance has been allowed to lapse.

Aside from the cash and free training care which the government offers to the veteran, it also gives him a preference in federal jobs. At the moment, half the men

employed in civilian jobs by the U. S. Government have seen military service. Officials estimate this proportion will rise to three quarters in the next 2 yr. With women employees included, the current proportion of veterans is 37 pct; a year ago, it was only 15.8 pct. In competitive Civil Service examinations for jobs paying less than $3000 a year, veterans automatically go to the top of the list. For more professional and technical jobs, veterans get a five or ten point bonus on their examination grades. Some fears have naturally been expressed that, as the years go by, these preferences will make federal employment a system of relief for the second-rate veteran, unsuccessful in outside competition.

This is only a brief summary of the benefits available to veterans; there are others for special groups—automobiles for amputees is one example. And if history repeats itself, there are more to come. If it does not, it will not be for want of trying on the part of the American Legion—the biggest of the veterans' organizations—or, to a lesser extent, the Veterans of Foreign Wars. A group of Congressional Medallists in this organization has recently been asking for a life pension of $300 a month.

But there are signs that the veterans' organizations will not present a united front to the Administration. After the Legion's San Francisco Convention, the American Veterans' Committee came out firmly with an endorsement of General Bradley's stand. On the political side, too, there will be considerable divergence between the AVC and the Legion, with other veterans' organizations taking intermediate lines. The AVC has campaigned through the summer against a lifting of price controls: the Legion has had a very questionable policy—lukewarm would be an understatement—on the veterans' housing program. The Legion is also much more defense-conscious and many resolutions were passed at San Francisco favoring a strong fully-armed military policy.

It is still too early to make any

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definite predictions of the way veterans, as a group—or rather a number of groups—will shape up in their active relations with the government. And if the policy within their organizations is still in a tentative stage, it is still more tentative locally over the country. The full-stop which the veterans came to in Athens, Tenn., when, having seized power from the local machine, they were unsure what to do with it, is a significant indication of the embryonic stage in political consciousness.

But the record, on both sides, is still so far clean as compared with the 1919-41 record. On the government's side, the VA, so long as it adheres to its new line of policy—and after San Francisco there can be little doubt of that—has set a course of administrative relations with veterans. On the veterans' side there is certainly more danger of a relapse, but signs are much more hopeful than last time. And there are many veterans who want the comparatively clean record to stay that way.

Spot Sale of Surplus Stocks Still Overseas Moves Difficult Items

Paris

• • • **Ten-ton trucks,** a 10,000-gal railroad tank car, jungle suits, arctic sleeping bags, tooth brushes, erasers and G.I. mess trays are among the miscellany of items from the incidental paraphernalia of war sold off during the first 10 days of the "over-the-counter" sales program from surplus U. S. war stocks located in depots in Belgium.

While negotiations are under way with French, Polish and Austrian purchasing missions on deals involving $16,000,000, other completed sales during the period rang the cash register for approximately $5,000,000. Over-the-counter sales and negotiations are additional to regular sales of items offered on published lists against closed bids.

The accelerated version of surplus liquidation, with salesmen at depots completing transactions on the spot, has attracted buyers from almost every country in Europe and also from the United States, the British Isles, Canada, and South America.

Commenting on the results of the first 10 days of the sales, Mr. Paul Hyde Bonner, Central Field Commissioner of Europe, Office of the Foreign Liquidation Commissioner, said the "over-the-counter" program "is completely successful and has widened the range of buying."

"Getting the buyer and the stocks together not only has increased the volume of sales on critical items, but has also resulted in moving considerable quantities of items previously ignored by the buyers," he said.

Particularly active in the market are the official missions from France, Poland, Austria, Holland, Finland and Greece with main interest centering on quartermaster stores at Antwerp where over-the-counter sales already have passed the $4,000,000 mark.

According to current figures, France has contracted for approximately $10,000,000 worth of stocks of all types ranging from heavy-duty trucks to toilet soap. Poland, buying against its $50,000,000 war surplus credit, already has tagged about $4,000,000 worth of stocks and Austria, with a $10,000,000 credit, has signed for about $2,000,000.

Although government purchasing missions so far have been the volume buyers, sales to private firms and to individual buyers are soaring. SPACS, a Montreal firm, got a consignment of oxygen cylinders for $2912; Dutch buyers bought 1045 wheelbarrows, burlap and jute bags; a Swedish firm got $6000 worth of cheesecloth, and a Swiss medical supply house $7850 worth of sulfur drugs, cast plaster, and chloroform. Greek purchases include arctic sleeping bags, erasers, office supplies, and mess trays.

Sales were made in all subdepots in Belgium in addition to the main surplus centers at Antwerp, Brussels, Liege, Chievres, Belcelle, Courcelles, and La Louviers.

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